Math 5052-Spring 2015

Measure theory and Functional Analysis II

General information

Location: Cupples I Room 111
Time: TTh 1-2:30pm
Professor: Greg Knese
Office location: Cupples I room 211A
Office hours: TTh 9:30-11am, by appointment, or just drop by.

Course description

Continuation of Math 5051. Topics include introductions to Banach spaces, harmonic analysis, operator theory, distributions. Time permitting we may look into Haar measure, PDE, and/or probability.

Math 5051-5052 form the basis for the Ph.D. qualifying exam in analysis. Prerequisites: Math 4111, 417, 418, and 5051. You should be proficient in undergraduate real analysis: naive set theory, epsilon-delta proofs, topology of R^n, topology of metric spaces, and some general topology.

References

There will be no official text for the course. We will draw from and refer to:

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

Basic real analysis and **Advanced real analysis** by Anthony Knapp. Available on campus at www.springerlink.com.
See http://link.springer.com/book/10.1007/0-8176-4441-5
http://link.springer.com/book/10.1007/0-8176-4442-3

Exams

There will be one midterm and a final exam on May 5, 1-3pm in Cupples I room 199. Those taking the real analysis qualifying exam will go 1-4pm. The midterm date will be announced later. We may discuss the possibility of two midterms or additional exam practice.

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%

Supplementary References

The following are some good alternative references for this course.

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