Topics in analysis: Harmonic analysis Instructor: Russell Brown
MWF 1-1:50pm Office: POT741
CB 343 Phone: 859 257 3951
Spring 2012 rbrown@uky.edu
Office hours: MWF 10-11
and by appointment.

In this course, we will learn the basic facts about the Fourier transform and harmonic analysis on $\mathbf{R}^n$ and use these tools to study questions in partial differential equations.

As our applications, we will look at a recent result of Boaz and Haberman related to the inverse conductivity problem and results of Ruiz and collaborators related to backscattering.

The prerequisite for this course is our first year real analysis sequence, MA 575 and MA 676, and a willingness to occasionally believe results that we do not have the time to prove in detail.

Grading: Your grade will be determined as follows.

Homework	100
Presentation	100
Seminars	100
Total	300

Homework: We will have different grading criteria for qualified PhD students and students who will qualify in the future.

A small number of homework assignments will be made for students who have not qualified.

All students will be asked to proof-read one chapter of the lecture notes.

Presentation: Each student will be given a paper to read and asked to make a presentation of about 50 minutes based on this paper.

Students will be asked to write a short summary of the main ideas of the paper.

In general, I prefer that the presentations do not use Beamer or other presentation software. I prefer a talk at the chalkboard.

For students who have qualified, I will make an effort to make sure that the paper is connected with their research.

Some of the presentations will not be held during regular class time. All registered students are expected to attend presentations unless they conflict with another class or teaching.

Seminars: All students should attend four seminars or presentations with mathematical content. This includes departmental seminars, seminars in application areas and presentations related to teaching of mathematics.

Students may not use presentations given in this class to satisfy this requirement.

Additional references:

- *Harmonic Analysis,* Elias Stein.

- *Uniqueness in Calderon's problem with Lipschitz conductivities,* B. Haberman and D. Tataru, `http://arxiv.org/abs/1108.6068`

- *Partial recovery of a potential from backscattering data,* A. Ruiz and A. Vargas, Comm. Partial Differential Equations **30** (2005), 67–96.

January 10, 2012