MATH 421 / MATH 510: Functional Analysis

(3 credits)

Instructor: M. Barlow
Office: Math. Annex 1209
Tu.Th. 11.00-12.30
Classroom
Office hours: to be announced

Text: G.B. Folland. *Real Analysis - Modern techniques and their applications* (2nd ed.).

Outline. This cross-listed 1st-year graduate/4th.-year undergraduate course will give an introduction to functional analysis. This is core material which, together with the measure and integration theory covered in Math 420/510, provides the foundation for much of mathematical analysis. It is an essential part of a graduate education or advanced undergraduate education in mathematics. It will be useful in many areas of pure and applied mathematics, including harmonic analysis, differential equations, probability theory, information theory, differential geometry, and mathematical physics. The course will be based on Chapter 5, with parts of chapters 4, 6 and maybe 9 of the text.

The course will continue from Math 420/509, and will treat the following topics.

1. Banach spaces
2. Point set topology, strong, weak, and weak* topologies.
3. Hilbert spaces.
4. L^p spaces. (Chapter 6).
5. Additional topics, if time permits: distributions, bounded operators and spectral theory.

Prerequisites: Math 420/507 or equivalent.

Grading: Homeworks (40%), two quizzes (20%), midterm (either March 24th or 26th) (40%). No final.