MATH 362B - FUNCTIONAL ANALYSIS - SPRING 2015

Instructor: Jesse Peterson
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Office: SC 1414
Office Hours:
Mondays: 2:10-3:00pm
Wednesdays: 2:10-3:00pm
Fridays: 2:10-3:00pm
Or by appointment

Prerequisites: An introductory course in Functional Analysis.

Recommended Textbooks:

Gerald B. Folland, *A Course in Abstract Harmonic Analysis*, ISBN number: 978-0849384905.

Bachir Bekka, Pierre de la de la Harpe, Alain Valette, *Kazhdan's Property (T)*, ISBN number: 978-0521887205.

Description:

This course will deal with applications of functional analysis, focusing on the representation theory of countable and locally compact groups. The first half of the course will cover topics including the spectral theorem for unbounded operators, Stone's Theorem, the Stone-von Neumann Theorem, amenability and paradoxical decompositions. The second half of the course will focus on Kazhdan's property (T) and its applications, we'll provide a number of examples of property (T) groups (including $SL_3(\mathbb{Z})$), and we'll discuss a number of different characterizations of property (T) including the Delorme-Guichardet Theorem, Shalom's Theorem, and Ozawa's Theorem.

We'll study locally convex topological vector spaces, Banach spaces, and Hilbert spaces as well as operators on such spaces. We'll also discuss applications of these techniques to ergodic theory, differential equations, and locally compact groups.

Grades:

Grades will be based on class attendance/participation, assigned homework and in class presentations.

Seminar:

The Subfactor Seminar is held each Friday from 4:10-5:30pm in SC 1432. This seminar focuses on topics from von Neumann algebras, subfactors, and related areas. If students feel that they might be interested in operator algebras, it is the best opportunity to get a feel for the subject. There is also beer and pizza afterwards.