Functional Analysis
MATH 7/8356

Syllabus

Class: M and W 12:40-2:05 in Dunn Hall, room 203

Instructor: Fernanda Botelho
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Office 363 in Dunn Hall
(901)-678-3131

Office hours: M and W 2:30-4:00 or by appointment

Textbook: "Banach algebras techniques in operator theory" by R. Douglas (recommended only)

Topics:

Review of topics from the theory of Banach spaces including Hahn-Banach Theorem, Open-Mapping Theorem, Closed Graph Theorem, and the Uniform Boundedness Principle. Weak convergence and weak compactness in normed linear spaces.
Basic results from Banach algebras including the Gelfand transform, the Gelfand-Mazur Theorem, the Gelfand Therem for commutative Banach algebras and the spectral radius formula. Discussion of several examples.
Topics from operator theory on Hilbert spaces and on C* algebras including projections, normal and self-adjoint operators, compact operators, Fredholm and Toeplitz operators. The Gelfand-Naimark Theorem, the Spectral Theorem and the Functional Calculus.

Evaluation: Evaluation will be based on attendance, class attentiveness and enthusiasm for the topic, presentation(s) (each student will be invited to give no less than one 20-25m presentation and no more than 2 on an pre-assigned topic) and one written project due the second week of April (this project should be typed using latex with no less than 5 pages and no more than 10 pages on some approved topic).

First class: January 17, 2017

Last class: April 26, 2017

Spring Break: March 6-12 (no classes)