Math 546: Hilbert Spaces
Fall 2022
Lectures: 10-10:50 am, 447 Altgeld Hall
Instructor: Florin P. Boca (fboca@illinois.edu)
Office Hours: TBA

This course will provide an introduction to the spectral theory of linear operators on Hilbert spaces. The main topics will include:

- Review on measure and integration.
- Riesz holomorphic functional calculus and spectrum in Banach algebras.
- The Gelfand transform and general properties of C^*-algebras. Gelfand-Naimark theory.
- Positive maps and dilation.
- Compact operators. Schatten-von Neumann classes. Fredholm operators and index.
- Unbounded operators. The Stone-von Neumann theorem.
- Basics on von Neumann algebras.

Prerequisites: Successful completion of Math 541, or acquaintance with Chapter 5 (Elements of Functional Analysis) and with Chapter 7 (Radon Measures) in Folland's book on Real Analysis.

Textbook: The textbook "A Course in Operator Theory" by John B. Conway (Graduate Studies in Mathematics, Vol. 21, American Mathematical Society, 2000) is recommended and will be used as main reference. The book "A Course in Functional Analysis" (Springer, 1990), by the same author, provides good resources for some parts of the course.
The instructor will provide his own notes.

Grading: The final grade will be based on a final term presentation, four homework assignments, and class participation.