

MATH 85600 *Functional Analysis*
Friday 2:00 – 4:00 PM

Spring 2015

Instructor: Prof. Radosław (Radek) Wojciechowski
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Course Description: This will be a one semester introduction to functional analysis. The goal will be to cover several aspects of spectral theory. The prerequisites consists of basics of real and complex analysis and basic topology. Hopefully students will have some familiarity with Hilbert and Banach spaces though most important topics will be reviewed at the beginning.

Topics include:

- Hilbert and Banach spaces
- Basics of operator theory
- Open mapping and closed graph theorem
- Compact operators
- Spectrum and the spectral theorem
- Unbounded operators

Classic applications and examples will be discussed as well as the case of the Laplacian on infinite graphs.

Grading: Homework problems will be assigned throughout the semester. These will give a basis for the grade.

Suggested Textbooks:

1. Y. Eidelman, V. Milman and A. Tsoolomitis, *Functional analysis: An introduction*, Graduate Studies in Mathematics, vol. 66, American Mathematical Society, 2004.
2. B. D. MacCluer, *Elementary functional analysis*, Graduate Texts in Mathematics, vol. 253, Springer, New York, 2009.
3. M. Reed and B. Simon, *Methods of modern mathematical physics I. Functional analysis*, Academic Press, Inc., 1980.
4. J. Weidmann, *Linear operators in Hilbert spaces*, Graduate Texts in Mathematics, vol. 68, Springer, 1980.