MA54600: Introduction to Functional Analysis

Instructor: Marius Dadarlat
Time: MWF, 12:30pm-1:20pm
Location: UNIV 303

Syllabus:

1. Banach spaces
2. Hilbert spaces
3. Linear Operators and functionals
4. The Hahn-Banach Theorem
5. Duality
6. The Open Mapping Theorem
7. The Uniform Boundedness Principle
8. Weak Topologies
9. Spectra of operators
10. Compact operators
11. Banach algebras and C*-algebras
12. Riesz calculus
13. Fredholm index
14. Gelfand transform
15. Spectral theorem for normal operators
If time allows:
16. Unbounded Operators
17. Applications: Differential operators, Peter-Weyl theorem

Prerequisites: Familiarity with basic measure theory

Grading:
Attendance 35%,
HW 40%,
Final Exam 25% (a take-home 36 hours no collaboration exam).

No specific textbook is required. These topics are covered by most books on functional analysis. A good reference is: Gert Pedersen, *Analysis Now*, (Graduate Texts in Mathematics) *Corrected Edition*!