

MATH 421/510–Real Analysis II/ Functional Analysis

Section 101, Winter Term 2, 2014.

Tues. Thurs. 11-12:30, Math Annex 1102

Instructor: Ed Perkins

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Course webpage:(TBA) <http://www.math.ubc.ca/~perkins/teaching.html>

Office Hours: (TBA)

Text: *Real Analysis: Modern Techniques and Their Applications*, Wiley-Interscience, 2nd ed., 1999 by G. Folland.

Course Outline

This cross-listed 1st-year graduate/4th.-year undergraduate course gives an introduction to functional analysis, core material which, together with the measure and integration theory covered in Math 420/510, provides the foundation for much of mathematical analysis. It is an essential part of a graduate education or advanced undergraduate education in mathematics. It will be useful in many areas of pure and applied mathematics, including harmonic analysis, differential equations, probability theory, information theory, differential geometry, and mathematical physics. The course will be based on (approx.) chapter 5 and parts of chapters 6 and 9 of the text:

1. Banach Spaces.
2. Strong, weak, and weak* topologies.
3. Hahn-Banach, open mapping and closed graph theorems.
4. Hilbert spaces.
5. L^p spaces.

Additional topics including perhaps:

6. Spectral theory of bounded operators.
7. Theory of distributions (generalized functions).
8. Sobolev spaces.

Pre-requisites: UBC Math 420/507 or equivalent.

Grading Scheme: Bi-weekly (approx.) assignments (posted on the course webpage) : 50
Final exam: 50