Introduction to Functional Analysis

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Office Hours:	N/A	**Class Time:**	N/A
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Course Description

Functional analysis is the study of (potentially infinite-dimensional) vector spaces and linear functions on them. We will begin by discussing the definition of Banach (normed) and Hilbert (inner product) spaces, then get into the meat of linear operators– boundedness, extensions, etc. Functional vector spaces are pretty key examples throughout this and so we will spend time constructing these examples. The goal will be to build up to spectral theory, a subfield of functional analysis that concerns with defining a more abstract form of "eigenvalue" for general vector spaces. Spectral theory proves ubiquitous because we can learn a lot about differential operators and more on function spaces by studying their spectrum.

Course Objectives

At the end of this course you should

1. Be familiar with –
2. Be able to state, understand, and apply –

Texts

Introductory Functional Analysis, Kreyzig (edition).

Applied Analysis, Hunter (edition).

Course Policies

N/A

Class Schedule

Week 1, 10/27 - 11/3: Review of Fundamental: Metric and Vector Spaces

Be able to prove:

- Proposition 1
- Proposition 2

Be able to state, understand, and apply:

- Definition 1
- Definition 2

Be familiar with:

- Theorem 1
- Theorem 2

Read:
Chapters x of Kreyzig (Required)
Chapters y of Hunter (Optional)

Turn in:
Exercises x,y,z of Kreyzig
Exercises x', y', z' of Hunter

Week 2, 11/3 - 11/10: Banach Spaces: Blah

Be able to prove:

- Proposition 1
- Proposition 2

Be able to state, understand, and apply:

- Definition 1
- Definition 2

Be familiar with:

- Theorem 1
- Theorem 2

Read:
Chapters x of Kreyzig (Required)
Chapters y of Hunter (Optional)

Turn in:
Exercises x,y,z of Kreyzig
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