Math 7338: Functional Analysis

The following topics are representative of those covered in this course.

- Normed, Banach, and Hilbert spaces.
- Operators on Banach and Hilbert spaces, linear functionals, the Riesz Representation Theorem.
- Hahn-Banach theorem, Baire Category theorem, open mappings theorem, closed graph theorem, and the uniform boundedness principle.
- Locally convex spaces, weak topologies, duality, Alaoglu's theorem, Krein-Milman theorem.
- Other applications and topics at the discretion of the instructor, such as:
  - Distributions.
  - The Fourier transform.
  - Sturm-Liouville systems.
  - Sobolev spaces.
  - Banach algebras.
  - Compact operators on a Banach space, Riesz functional calculus.
  - Fixed point theorems.

Reference:

- Conway: *A Course in Functional Analysis, 2nd edition, Springer-Verlag.*