

## MAT 579 Functional Analysis II Course Announcement

**Professor:** John Quigg

**Semester:** Spring 2023

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**Classes:** Tuesday and Thursday 10:30–11:45 in DISCOVERY 301

**Description:** This is the second half of a year-long sequence in functional analysis, which is the study of vector spaces equipped with a compatible topology, and continuous linear maps between them. This second semester is focused on spectral theory, culminating in the Spectral Theorem for normal operators on Hilbert space, one of the pinnacles of modern analysis. It has been apparent for quite a while that the natural context for the development of spectral theory is  $C^*$ -algebras, and the build-up to that occupies almost half of the course. The highlight along the way is the Gelfand transform, which is a vast generalization of the Fourier transform.

**Prerequisites:** MAT 578 or instructor approval. Beyond the basics of functional analysis, including Banach spaces, locally convex spaces, and weak topologies, it would help to have some familiarity with a tiny bit of (abstract) algebra and complex analysis, and a bit more topology.

However, I want to emphasize that, regardless of your background, if you are at all interested in this course, please contact me at quigg@asu.edu or WXMLR 728.

**Textbook:** There is no required text — instead, I will post lecture notes. But suggested references include:

- W. Arveson, “A short course on spectral theory”, Springer-Verlag, 2002.
- J.B. Conway, “A Course in Functional Analysis”, 2nd ed., Springer-Verlag, 1990.
- G.B. Folland, “Real Analysis”, 2nd ed., Wiley, 1999.
- G.J. Murphy, “ $C^*$ -algebras and operator theory”, Academic Press, 1990.
- G.K. Pedersen, “Analysis now”, Springer-Verlag, 1989.
- W. Rudin, “Functional Analysis”, 2nd ed., McGraw-Hill, 1991.