

MAT 598 C^* -Algebras — Announcement

Professor: John Quigg

Semester: Fall 2020

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Classes: Tuesday and Thursday 1:30–2:45 in COOR L1-84

Description: C^* -algebras is the mathematics that grew out of quantum mechanics in the early 20th century, and in the past fifty years has expanded into many other areas. For a long time C^* -algebras have been used in the study of group representations, and they've also been applied to dynamical systems, “noncommutative geometry”, “free probability”, graph theory and other combinatorial structures, and number theory, among other things. Although a part of analysis (more precisely, functional analysis), the area of C^* -algebras makes heavy use of lots of other math, for example algebra, topology, combinatorics, and geometry.

The content of this course will depend to a large extent upon the audience. One possibility — among various others — is that we'll assume some level of acquaintance with the spectral theorem and “basic” functional analysis, then work through the fundamental theory of C^* -algebras at some speed (maybe fast, maybe slow, maybe variable). We could then discuss a few advanced topics, possibly including tensor products, group algebras, C^* -dynamical systems, graph algebras, or C^* -correspondences.

It's not easy to give anything like a precise list of prerequisites, but roughly speaking it would be good to have a working knowledge of functional analysis, (abstract) algebra, and topology. In any case, I encourage anyone interested in the course to contact me at quigg@asu.edu, or my office WXL R 728.

I'll use my own lecture notes, but suggested references include:

- Conway, “A Course in Functional Analysis”,
- Rudin, “Functional Analysis”,
- Arveson, “A Short Course on Spectral Theory”,
- Raeburn and Williams, “Morita Equivalence and Continuous-Trace C^* -algebras”,
- Williams, “A (Very) Short Course on C^* -algebras” (online lecture notes).

The grade will be based on occasional homework (no exams).