

## Math 595-Operator algebra methods in Quantum Information Theory

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**CRN:** 62754/ **Section:** QIT

**Starting date:** October 23

Quantum Information Theory is situated somewhere between physics computer science and math. In fact, the most mathematical aspect comes from Shannon's information theory, and the foundations of quantum mechanics. This course has three parts. In the first part we collect basic material from quantum mechanics and information theory, but little coding theory. In the second part we combine this in covering the basics about entanglement, superdense coding and teleportation. In the last part, we discuss some new aspects coming from functional analysis. However, the main focus here is on finite dimensional spaces and linear algebra, maybe basic finite dimensional Hilbert space theory, is the main prerequisite.

**Literature:** 1) Quantum Information Theory - Mark M. Wilde, Cambridge University Press  
2) Quantum Computation and Quantum Information 10 th Anniversary Edition, by Nielsen and Chang.