Quantum Mechanics illuminates a “weird” microscopic world where our classical intuitions no longer apply. After decades of mulling over this weirdness, Physicists, Mathematicians, Computer Scientists and Engineers began to finally discover clever ways of putting this weirdness to work. Quantum computers can solve several computationally hard problems more efficiently than it is possible with classical computers and quantum cryptography offers encryptions whose security is guaranteed by the fundamental laws of nature.

Quantum Shannon Theory is the generalization of Shannon’s Information Theory to include the compression of quantum states, the transmission of classical and quantum states over noisy channels, and the use of quantum entanglement in different ways. This leads to a plethora of fundamental quantum communication tasks. However, in this class you will learn that most of these results are related – revealing the rich structure of this beautiful theory.

Due to the interdisciplinary nature of quantum information science this course is suitable for students in computer science, electrical engineering, mathematics, physics, and nanotechnology. There are no prerequisites for the course. All necessary interdisciplinary concepts and tools will be introduced during the class and “super-dense coded” into your brain.

Term: Spring 2008  
Time: Tues, Thurs 12:00pm – 1:15pm  
Location: HEC 302  
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