CMPT 409 - D100 Spec.Topics/Theoretical Cmpt

**Instructor(s):** Steve Pearce

**Calendar Objective/Description:** Spec.Topics/Theoretical Cmpt

**Instructor's Objectives:**

This is an introductory course in Quantum Computing with an emphasis on quantum algorithms. Course objectives include understanding the fundamental nature of quantum mechanics and how it can be exploited for the purposes of computation (i.e., superposition, entanglement, interference, etc.); understanding the relationship between classical circuits and quantum circuits (qubits, the Bloch sphere, quantum gates, etc.); mastering the mathematics necessary for quantum computing (Hilbert spaces, complex probability amplitudes, etc.); understanding the fundamental theorems underlying quantum computing (Church-Turing, threshold, no-cloning, adiabatic, etc.) and the setting within the theory of computation (BQP, QMA and QCMA); understanding the best currently known quantum algorithms (i.e., Deutsch–Jozsa, Grover’s, Shor’s, Fourier, etc.).

The principal aim of this course is to implement quantum algorithms on a virtual quantum computer such as the IBM Q Experience (Qiskit), Rigetti pyquil and D-Wave’s Leap.

The only prerequisite is linear algebra - students without CMPT 307 can enroll with a waiver.

**Prerequisites:**

see go.sfu.ca

**Grading:**

TBA in class.

**Academic Honesty Statement:**

Academic honesty plays a key role in our efforts to maintain a high standard of academic excellence and integrity. Students are advised that ALL acts of intellectual dishonesty will be handled in accordance with the SFU Academic Honesty and Student Conduct Policies (http://www.sfu.ca/policies/gazette/student.html).