New course

ECSE-4964
Quantum Computer Programming

Mon & Thurs 4pm–5:20pm

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Catalog: Intro to quantum mechanics. Various physical realizations of quantum computing. The IBM Q. Quantum states and qbits. Quantum gates including Hadamard, Pauli-XYZ, Toffoli, Fredkin. Qiskit. Quantum algorithms, including Grover, Shor, and recent quantum algorithms. Investigating quantum hardware using qiskit.

Pre-requisites: ECSE-2610, CSCI-2200, and PHYS-1200.

Suggested textbooks: 1. Noson S. Yanofsky and Mirco A. Mannucci, Quantum Computing for Computer Scientists, 2008; 2. Abraham Asfaw et al, Learn Quantum Computation using Qiskit, http://community.qiskit.org/textbook, 2020; 3. N. David Mermin, Quantum Computer Science An Introduction, 2006.

Learning Outcomes: 1. Demonstrate proficiency with the mathematics behind quantum algorithms. 2. Identify the concepts with today's non-fault-tolerant quantum devices. 3. Apply these procedures to write code in Qiskit to implement quantum algorithms on IBM's cloud quantum systems.