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PROGRAMMING UNIVERSAL GATE QUANTUM COMPUTERS



Mondays and Wednesdays (4:40pm to 6:00pm @ 3SC 265)

Daniel Justice

Location

We currently have a room at 3SC 265. I will be going in person as well as streaming via Zoom (Link on Piazza). I encourage you to come to class if it falls within your personal risk management system.

Course Goals

Students will gain familiarity with current universal gate quantum computing tools and technology. Students will also become comfortable with several QC algorithms and their implementation on state of the art quantum computer simulators and hardware.

Grading

60% Homeworks, 10% Participation, 30% weekly quizzes.

Quizzes

Each week a quiz will be given. The worst one will not be counted.

Prerequisites

Python, Jupyter Notebooks, Linear Algebra

Students will **not** need an understanding of quantum mechanics.

Note: The syllabus is subject to occasional change. This is especially the case in the latter half of the semester once your professors have become comfortable with the group's overall skill level. Adequate notice will be given.

Basic course structure

Due to this being a mini, we will do our best to skirt into a new topic each and every day.

Schedule

Day 1 (10/18): Introduction

Day 2 (10/20): Qubits

Day 3 (10/25): Multiple Qubits

Day 4 (10/27): Quantum Teleportation

Day 5 (11/01): BB84

Day 6 (11/03): Quantum Arithmetic and Logic

Day 7 (11/08): Amplitude Amplification

Day 8 (11/10): QFT: Quantum Fourier Transform

Day 9 (11/15): Quantum Phase Estimation

Day 10 (11/17): Real Data

Day 11 (11/22): Quantum Search

No Class (11/24): Thanksgiving!

Day 12 (11/29): Prabh Baweja

Day 13 (12/01): Shor's Factoring Algorithm

Schedule with assignments, readings, etc. can be found [here](#)