MATH. 5803. SEC. 001, QUANTUM COMPUTING, FALL 2022
MWF 11:30-12:20 AM
1105 PHSC

Instructor: Tomasz Przebinda, Room 524, PHSC; home page: tomasz.przebinda.com;

Email: tprzebinda@gmail.com;

Office hours: via zoom, by appointment.

Text: We shall follow several spurces in cluding the calssic: "Quantum Computation and Quantum Information" by Michael A. Nielsen, and Isaac L. Chuang available at Bizzell Memorial Library.

Course outline: Quantum information theory is a rapidly growing field that aims to exploit the laws of quantum mechanics to design fundamentally new approaches to computation and communication. It has a tremendous impact on applied science. For example, Shor's algorithm for factoring large numbers, published in 1994, threatens the RSA cryptosystem and prompted the sell of RSA Data Security founded by Rivest, Shamir, and Adelman in 1996.

In the last decade some of the leading global tech corporations including IBM, Microsoft, and Google have followed the lead of Canadian startup D-Wave Systems and are investing significant resources into the development of quantum computing hardware.

The aim of this course is to study the basic quantum algorithms, that is the algorithms that could be run on a quantum computer. They are interesting in their own right, but the likelihood of a quantum computer being build in a near future is increasing.

No background beyond basic linear algebra is required.

Final grade: The final grade is going to be based on weekly assigned homework (80%) and the final project (20%).

Students with Disabilities: Any student having a disability that may interfere with the demonstration of his or her abilities should contact me as soon as possible to arrange accommodations necessary to ensure full participation in the course.

Grade of Incomplete: The grade of "I" is a special-purpose grade given when a specific task needs to be completed to finish the course work. This is typically a term paper or other special assignment, so rarely makes sense in a mathematics course. An "I" cannot be given to avoid a low grade in cases where the course work is not strong.