Welcome to:
CIS 4XX Introduction to Quantum Simulation!
Instructor: Prof. Rodrick Kuate Defo
SPRING 2027

Instructor:	Prof. Rodrick Kuate Defo Office: 4-293 CST Email: rkuatede@syr.edu
Lectures:	TBD, TBD
Office Hours:	T 12:00 PM - 1:00 PM, CST 4-293 W 11:00 AM - 12:00 PM, CST 4-293
Prerequisites:	Linear Algebra (MAT 331, ECS 204, or PHY 302), and either discrete mathematics (CIS 375) or quantum mechanics (PHY 361 or CHE 356) or permission of instructor

Text: **Noson S. Yanofsky** and **Mirco A. Mannucci**, *Quantum Computing for Computer Scientists,* Pearson Education 2008, 1st Edition.

To purchase the CIS 4XX textbook from Cognella, Inc., please follow this link:
https://store.cognella.com/81090-2A-NI-032
If you experience any difficulties, please email orders@cognella.com or call 858-800-2675. You may also request the book from the library where it has been put on reserve.

Syracuse University has partnered with eCampus.com to deliver you required course materials with great discounts directly within Blackboard. To access your materials, go to your Blackboard course site, click the "View course & institution tools" link under "Details & Actions", and then click the "Orange Instant Access" link for eBooks. If you would like to opt-out of participation in this program, you may do so through the "Orange Instant Access" link in Blackboard.

Please also see this student website for ordering books: https://syracuse.ecampus.com/
Here is a link to the Syracuse support page for OIA: https://www.syrcampusstore.com/oia
The access to the course textbook through OIA is a **rental access** that lasts the length of the semester.

Course Description

Quantum computing is a very exciting field that has garnered significant interest from big industry players including Microsoft, IBM, and Google. The purpose of this high-structure course is

to increase your familiarity with these quantum simulation tools, which include Quirk, QUTIP, and Qisket. A background to quantum mechanics will first be provided, followed by applications of quantum mechanics to cybersecurity and chemistry. I will then introduce the quantum simulation tools and you will get to complete homework assignments to increase your familiarity with the tools. We will wrap up the high-structure course by discussing some codes that have been developed to correct the errors that plague existing quantum computing technologies. Our complete syllabus is very long! So, I've posted it on Blackboard and that way you can always find anything you need right away by doing a search (control f).

Course Requirements:

1. Quizzes (15%): Weekly at the beginning of class.
1. Problem-Based Homework Assignments (25%): Issued every two weeks, due two weeks later (at the beginning of the class). The lowest homework grade will be dropped.
2. Three Exams (50%): TBD (TBD), TBD (TBD), TBD from TBD (TBD)
   Exam 1 (25%), Exam 2 (25%), and Exam 3 (25%)
   (lowest exam grade will be dropped)
4. Small Group In-Class Practice (10%): Up to 10 absences will be excused.

References:

1. **Eric R. Johnston**, **Nic Harrigan**, and **Mercedes Gimeno-Segovia**, *Programming Quantum Computers: Essential Algorithms and Code Samples*, O'Reilly 2019, 1st Edition.

2. **Michael A. Nielsen** and **Isaac L. Chuang**, *Quantum Computation and Quantum Information*, Cambridge University Press 2016, 10th Anniversary Edition.