PHY 7097: Quantum Computing for Physicists
Fall Term 2020
Syllabus

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Synopsis

This is a one-semester introductory course on quantum information science and quantum computing. Topics include: qubits and their representation; basic operations on qubits; logic circuits; entanglement; quantum algorithms; classical and quantum error correction. The course will be very interactive and will feature hands-on tutorials in Qiskit illustrating the fundamental theoretical concepts covered in the lectures.

Prerequisites

Some knowledge of quantum mechanics is helpful but not required. Due to the large variety of computing platforms, students are expected to install Qiskit on their own. If you run into installation problems, ask one of your classmates, the computer support staff in the department, or the Qiskit online community (just google the exact error message which you got).

Time and Location

The class will meet three times a week, Monday, Wednesday and Friday from 11:45 - 12:35 (5th period). The lectures will be on zoom and the link and password will be sent out in advance.

Office Hours

Official office hours will be held on Mondays before class (11:00 - 11:45 am). You are welcome to ask questions by email at any time. Those will be answered in the order received, and typically within 48 hours whenever possible. Again, try googling for the answer to your question before asking the lecturers.

Required Materials

The course lectures will be available on canvas. No single textbook will be used, but several relevant books and journal articles are listed under the "References" link on the class web page.

Class web page

The class web page will contain the most up-to-date information about the class. There you will find the class diary, the syllabus, useful references and any homework assignments. Please check for updates regularly, especially if you miss a lecture.

Homework assignments

There will be optional weekly homework assignments posted on the class webpage.

Exams

There will be two in-class (11:45 am - 12:35 pm) periodic testing exams. The dates of the exams are already announced and are as follows: October 14 (Wednesday) and December 7 (Monday). Please mark your calendars and make sure to be available to take the exams on those days. There will be no final cumulative exam. The exams will be closed book. Calculators, cell-phones and other hi-tech gadgets are not allowed on the exams.

Grading policy

Each of the two in-class exams will contribute 50% towards the final grade.
At http://www.phys.ufl.edu/downloads/gradepolicy.pdf you can see the Physics Department policy on incomplete grades. For additional details regarding grading policies, see the university website: https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/

Accommodations for students with disabilities

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, www.dso.ufl.edu/drc/) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

Academic honesty

UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Honor Code (http://www.dso.ufl.edu/sccr/process/student-conduct-honorcode/) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class."

Online evaluations

Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at https://evaluations.ufl.edu. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at https://evaluations.ufl.edu/results/.

Advising and Counseling

Due to the nature of the environment at the university, it is not uncommon for students to experience stressful situations, and "study harder" sometimes does not seem to work. If you find yourself in this situation, you are encouraged to seek confidential counseling, see: http://www.counseling.ufl.edu/cwc/.

Syllabus addendum: zoom code of conduct

The University of Florida Student Honor Code and Student Conduct Code continue to apply to online behavior. You are expected to be professional and respectful when attending class on Zoom. The following are class policies for our meetings with Zoom. Please read carefully, these policies are effective immediately and all students are expected to adhere to them.

- **Do not share your Zoom classroom link or password with others.**

- **Sign in with your full first name and last name as listed on the class roster.** Do not use a nickname or other pseudonym when you log in. However, if you prefer to be referred to by a nickname, you may add it in parentheses after your full name. Using your full name allows to quickly see who is in attendance and to sort students into their groups when needed.

- **Stay focused.** Please stay engaged in class activities. Close any apps on your device that are not relevant and turn off notifications.

- **Turn on your video when possible.** It is helpful to be able to see each other, just as in an in-person class.

- **Keep it clean.** Don't share anything you wouldn't put up on the projector in class!

- **Mute your microphone when you are not talking.** This helps eliminate background noise.

- **Breakout rooms.** When you are assigned to a breakout room, enable your webcam and microphone so that your partners may hear and see who they are working with.

- **Use a headset when possible.** If you own headphones with a microphone, please use them. This improves audio quality.

- **Be in a quiet place when possible.** Find a quiet, distraction-free spot to log in. Turn off any music, videos, etc. in the background. Make sure you are uninterrupted by other household members, including pets.

- **Stay on topic.** Use the chat window only for questions and comments that are relevant to class. The chat window is not a place for socializing or posting comments that distract from the course activities. If you fill it up with random comments, the chat

moderator will be unable to sort through the information quickly to address students' real questions/concerns about the course.

- **Dress appropriately for class.** Even though you may be alone at home, your professor and classmates can see you.

- **Be aware of your surroundings.** Your professor and classmates can also see what is behind you, so be aware of your surroundings. Make sure the background is not distracting or something you would not want your classmates to see. You may use a virtual background if your device supports this feature. Be sure to avoid using backgrounds that may contain offensive images and language.

- **Follow the same rules of respectful interaction as you would in a face-to-face course.** This is especially important in a remote situation, where multiple voices attempting to speak at once result in no one being heard.

- **Refrain from eating** during the class hour, as you would in a face-to-face course.

- **No disrespect or hate speech.** Just like in our in-person class, respectful behavior is expected. Consider Zoom a professional environment, and act like you're at a job interview, even when you're typing in the chat.

- **Relax and enjoy class!** Remote learning presents some challenges but many rewards as well.