Version 1.0, circa August 27, 2022

Non-Relativistic Quantum Mechanics I (PHYS 2565)

- Instructor: dr.s. (Prof. Vladimir Savinov).
- Lectures: MWF 11:00am-11:50am, Allen Hall 106.
- Main textbook: Modern Quantum Mechanics, 3rd edition, by J. J. Sakurai and J. Napolitano
- Office hours will be scheduled as needed. Time for office hours and location will be announced in class, on CANVAS and via e-mail. The instructor will be available only during scheduled times.
- The best way to contact me is via e-mail: vps3@pitt.edu. I will communicate with class using CANVAS and e-mail. All e-mails sent to class will also be posted/archived on CANVAS.

Additional Textbooks

In addition to the main textbook, I also requested the following titles placed on reserve for this class at George M. Bevier Engineering Library:

- Principles of Quantum Mechanics, 2nd edition, by R. Shankar.
- Lectures on Quantum Mechanics, by Gordon Baym.
- Quantum Physics (vol.1): From Basics to Symmetries and Perturbations, by V. Zelevinsky.
- Quantum Physics (vol.2): From Time-Dependent Dynamics to Many-Body Physics and Quantum Chaos, by V. Zelevinsky.
- Lectures on Quantum Mechanics, by Steven Weinberg.
- Quantum Mechanics: Non-Relativistic Theory, 3rd edition, by L. D. Landau and E. M. Lifshits.
- Classical Mechanics, 3rd edition, by H. Goldstein, C. P. Poole and J. L. Safko.

  Note that amazon links to all these titles are provided just to make sure you know which books are available on reserve.

Course Description

Quantum Mechanics and, generally, Quantum Physics is an awesome subject. I will try my best to make this class interesting and useful for you, though it is a required class in our graduate program anyway. Topics I intend and hope to cover during the fall term include a review of mathematical concepts, the postulates of quantum mechanics, selected one-dimensional problems, the harmonic oscillator, the path integral approach to quantum mechanics, symmetries and angular momentum, the Hydrogen atom, spin, and addition of angular momentum. This is, more or less, the standard content for the first term of non-relativistic quantum mechanics. I will try to follow the main textbook (Sakurai/Napolitano, 3rd edition), the rest of the topics from this textbook will be covered during the second term in spring. Some of the material presented in class will be from a variety of other sources, so it would be a good idea to take notes.

Attendance

Attendance is not mandatory though, in my opinion, it would be a good idea to attend lectures. Students are most strongly advised to take lecture notes during class. Lectures will not be recorded and lecture notes will not be available, but I intend to make snapshots of my whiteboard to be generally available after class.

CANVAS

Up to date information about class, including assignments and complementary material, will be regularly posted on CANVAS. You can access CANVAS at http://canvas.pitt.edu (use your Pitt network computer account and password to log in). CANVAS information will be updated regularly. Make sure you check CANVAS for this class often.

Homework Assignments

Homework will be assigned (announced on CANVAS) regularly. You will be turning in your work as snapshots via GradeScope. Make sure to show all your work. Do not skip intermediate steps. Do not try to save (e-)paper. Please try to be neat. Do not e-mail your work to me or the grader (unless I request this) – always use GradeScope. Make it easy for the grader to figure out what you have done. Show ALL steps, do NOT assume that some of the steps are "obvious" or "trivial". Points will be taken off for incomplete explanations and/or difficult-to-follow work. Note that the "official" solutions should not be used as a reference of how much of your work you have to show: these solutions often provide only minimal guidance, important calculations and elaborations are not shown. Your own solutions should show all calculations and elaborations. This applies even more so to the exams. To summarize, your work must be exceptionally well-documented, with the explanations of what you do and why you do that. **This requirement is of particular importance at midterm and final exams.** Homework problem solutions will be posted on CANVAS. When you have questions for the grader, contact them (the grader, not me) via e-mail with a CC: to me.

Grading Scheme and Other Details

There will be one (take home) midterm and (take home) final exam. Midterm date will be announced at a later time, but no later than two weeks before the actual exam time. Same rule applies to your final exam during the last week of (graduate) classes. You will be given a time window to complete each exam. Your work will be score-graded. Each homework will be 10 points max. Similar scoring will be used for midterm and final exams. Your letter grade will be determined using your total score with contributions from your homework ($\sim$35%), midterm exam ($\sim$30%), and final exam ($\sim$35%). Correspondence of scores to letter grades will be announced in December after the grades are posted. If you have any questions / need anything clarified, please contact me at vps3@pitt.edu or ask in class.

Special and/or Unexpected Circumstances and Emergencies: Should such arise, please follow the following protocol: first take care of your emergency and/or unexpected circumstances and then, when you have time, send me an e-mail outlining your circumstances and the nature of your emergency. All such events will be handled on case-by-case basis. Generally, please do not rely on oral communications with me – it would be best to communicate your requests / explanations of your circumstances etc electronically.

University Policies: Over the past many years Pitt developed a large number of important policies outlined elsewhere. This syllabus is assumed to be in implicit 100% compliance with all these policies and regulations, many of which are also outlined in a separate document available to this class on CANVAS.