

Course Information

Physics 412: Introduction to Quantum Mechanics

Spring Semester 2021

Meeting Time, Location, etc.: Tuesdays and Thursdays, 11:30 am – 12:45 pm, room Nielsen 304, one floor down from the main entrance of the Nielsen building. Note this room is not the same as in P411.

Instructor: Prof. Elbio Dagotto, office: third floor South College building
edagotto@utk.edu ← email will be a very efficient means of communication this spring.

Textbook: *Introduction to Quantum Mechanics*, 3rd edition, D.J. Griffiths ([brown cover](#)).

There will be a total of 28 lectures days, including days for midterm exams and days for preparation for those exams, i.e. all the same as in P411.

Web page: Please arrive on time. The lectures in PDF format will appear in URL <http://sces.phys.utk.edu/%7Edagotto/QuantumMechanics/index2021.htm> shortly after being delivered. Also the audio of the lecture. I will do my best to send a few days before class the .pptx file if you wish to glance in advance, or take notes during lecture in that file. Taking notes in class is encouraged (asking questions, particularly “trivial” ones, also).

Format: This will be a **combination F2F+Zoom+recording environment**, exactly as in P411. Whoever wishes to use Zoom on a day of F2F, there is no need to notify me in advance. I am planning to have several days to be only Zoom to reduce a bit the chances of contagion. All this is evolving, we will see how it goes. Certainly you will be alerted a couple of days before in case a F2F+Zoom becomes only Zoom. I was not planning to record my lectures to induce the discipline in students to follow the class regularly. But the university requires me to record.

First class: Thursday, Jan 21, 11.30 am - 12.45 pm

Last class: Tuesday, April 27, 11.30 am - 12.45 pm

Final exam: Monday, May 3, 1 pm – 3.15 pm

Office Hours: Previous experience shows that students asking questions as the issues arise, as opposed to “at a fixed office-hour time”, works better in practice. See next.

Questions: Contact Prof. Dagotto by **email** for short questions. Example, you can send me a specific question or photographs of calculations that are causing trouble and I will do my best to help fast. I noticed **whatsapp** audio communication is also working well for many: you can text me a question (I will provide my phone number first class) and if the answer requires more than a couple of lines of typing, I can record in audio my response and even send you photographs of sketches by hand as illustration. Plus whatsapp audio

can be heard by the students many times and photos can be saved. If this fails, we can simply talk by phone, being careful not to be disruptive to those around us.

Prerequisites: You need P411 approved. I recommend that you review how to diagonalize 2x2 matrices which will be needed in the early portion of the class when we deal with the topic of “spin”. As in P411, you will NOT be asked to solve insanely complicated math problems. Integrals that are not immediate or require some smart change of variables, etc, will be given to you in the formula sheets of tests, or you are allowed to find online or using Mathematica for homeworks.

412 will primarily deal with the last portion of Ch.4, starting where we ended in P411, then cover most of Ch. 5 and then a “selection” of topics from Chapters 7, 8, 9, and 11. My apologies but there is zero chance that we can cover all the other nice topics left in the book. Maybe a few more. It is better to learn a small number of items very well, than many only superficially.

We will follow the text *quite closely*, but you may remember from P411 that sometimes I add new illustrations and URL links, or explain concepts deeper than in the book.

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Lecture notes, problem assignments, and exams will be located in the web page of the course <http://sces.phys.utk.edu/%7Edagotto/QuantumMechanics/index2021.htm>

The professor will do his best to send homework problem assignments by email as well, with deadline clearly written, and later I will send my solutions (shortly after your deadline). But it is the student’s responsibility to remain current with posted information.

Grading

In addition to the lectures, the course will include problem sets, two midterm exams, and a final (which will be like a third midterm exam in practice, as in P411). Course grades will be determined, same as in P411, by a weighted average of:

- (1) Problem Sets weight 40% (here a grader designated by the department will grade)
 - (2) Test 1, weight 20% ← covering first third of semester; [tentative 2/18 or 2/23](#).
 - (3) Test 2, weight 20% ← covering second third of semester; [tentative 3/23 or 3/25](#).
 - (4) Final, weight 20% ← “final” will cover the last third of semester; May 3, 1 PM.
- Midterm and final exams will be graded by professor.

Problem Set Policy The solving of problems is an essential part of this course.

It is allowed for students to work together on the HW problem sets. Interactions of this kind are much encouraged. However, **solutions to HW problem sets must be submitted in each student’s own hand**. The HW problems will be sent directly to the grader using a PDF format, scanning as you did in P411.

The given HW sets will include the deadline clearly written (typically you will have one week to complete). This deadline is strict. Shortly after deadline, solutions will be sent to

all students by email. Graded HW will be returned within a week or earlier. It is crucial that you present the solutions in a well-organized manner, with framed results, showing your work. **We are more interested in your procedure to solve a problem, more than the final result.** Make sketches by hand if needed to explain better your solutions. No need to save paper. **Partial credit will be generous. Take advantage of the possibility of collecting close to 40% of the grade via HW.** Plus you will be well prepared for exams by understanding the HW problems.

Note: Read in <https://www.aacu.org/leap/students/employers-top-ten> the top ten things employers look for in new college graduates. Among them is the ability to write and speak well, and think clearly about complex problems. QM will help to develop these abilities!

Tests Schedule

The dates of the tests will be announced in class, by email, and they will be posted in the class web page. Tentatively they are: **Test 1: Feb 18 or 23, Test 2: March 23 or 25.** The date of the final (Test 3) is fixed by UT and it is May 3 at 1 PM. It is the student's responsibility to remain current on these dates. **For all the tests, the lecture before will be for students to practice and ask questions. Do not be shy. You will not be graded or judged based on the type of question you formulate.**

No curve, but generous grade scale:

90-100	A
85-90	A-
80-85	B+
75-80	B
70-75	B-
65-70	C+
60-65	C
55-60	C-
Less 55	D,F range

University Disability Statement

Any student that may need a special accommodation based on the impact of a disability should contact me privately to discuss your specific needs. Please contact the Office of Disability Services at 865-974-6087 in Hoskins Library to coordinate reasonable accommodations for students with documented disabilities.

About virus motivated expected behavior please read <https://provost.utk.edu/wp-content/uploads/sites/10/2020/06/Syllabus-language-masks-and-social-distancing.pdf>