

Course Information

Physics 411: Introduction to Quantum Mechanics

Fall Semester 2018

Meeting Time: Tuesdays and Thursdays, 11:10 am – 12:25 pm. This is a total of 28 lectures including 2 days of midterm exams. Please arrive on time. The lectures in PDF format will appear in the web page shortly after being delivered, but I encourage that you take notes in class (and ask questions of course).

First class meeting on Thursday, Aug 23

*Class will **not** meet on Thursday Sept 13 (professor is lecturing elsewhere).*

*Class will **not** meet on Thursday Oct 4 (Fall Break)*

*Class will **not** meet on Thursday Nov 22 (Thanksgiving)*

Final class meeting on Tuesday, Dec 4

Final exam: to be decided by the university sometime Dec.6-13.

Class room location: Nielsen 304

Instructor: Prof. Elbio Dagotto, office: third floor South College building
edagotto@utk.edu ← very efficient means of communication!

Office Hours: Mondays 2:00-3:15 PM. Contact Prof. Dagotto by email for short questions, or for special office appointments.

Textbook: *Introduction to Quantum Mechanics*, 2nd edition, D.J. Griffiths ([blue cover](#)). Important warning! By total chance a 3rd edition of this same book is being announced to appear in August 2018. Unfortunately, I cannot wait for this book to be available to prepare lectures and problems, assuming it becomes available on time. The 2nd edition is already an excellent book, thus I will follow the 2nd edition. I doubt there will be many changes between 2nd and 3rd editions.

Prerequisites: Physics 411 requires a high degree of mathematical sophistication. *Confidence with simple derivatives, integrals, differential equations and linear algebra (matrices, eigenvalues, etc) are essential for success in this course.*

Physics 411 is the first semester of a two semester sequence (with 412) and is **mandatory** for all physics majors pursuing the Academic Physics Concentration. 411 will deal with the foundations of quantum mechanics and the development of formalism and techniques. I anticipate that the topics of Physics 411 will roughly cover chapters 1-5 of Griffiths and will follow the text *quite closely*. Specific topics will include:

- The wave function and the uncertainty principle.
- The time-independent Schrödinger Equation.
- One-dimensional potentials, such as the square well and harmonic oscillator.
- Introduction to linear algebra, Hilbert Space, Hermitian operators.

- Schrödinger Eq. in 3-Dimensions, hydrogen atom, angular momentum, spin.
- Identical particles ← if time allows

Course Information

Lecture notes, problem assignments, and exams will be located in the web page of the course <http://sces.phys.utk.edu/~dagotto/QuantumMechanics/index2018.htm>

The professor will do his best to send homework problems and solutions via email to everybody, perhaps even the lectures. 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. Course grades will be determined by a weighted average of:

- (1) Problem Sets weight 40% (here a grader designated by the department will grade, with the exception of the first set that the prof will handle)
 - (2) Midterm 1, weight 20% ← covering first third of semester; tentative 9/25 or 9/27.
 - (3) Midterm 2, weight 20% ← covering second third of semester; tentative 10/30 or 11/1.
 - (4) Final, weight 20% ← "final" will cover approx. the last third of semester.
- 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 problem sets. Interactions of this kind are much encouraged. However, solutions to problem sets must be submitted in each student's own hand. If the student worked with a study group, the names of the study group members must be noted on the submitted homework.

Homework sets will include the deadline (one week typically) clearly written. This deadline is strict. Solutions will be available in web page, or send to all students by email, shortly after deadline. It is crucial that you present the solutions in a well-organized manner, with framed results, showing your work. *Often we are 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.

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.

Exam Schedule

The dates of the midterm exams will be announced in class, by email, and they will be posted in the class web page. The date of the final will be made available on the University

Academic Calendar and it is fixed by the university. It is the student's responsibility to remain current on these dates.

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.