Course Syllabus

PHYS 417: Quantum Mechanics

MW 12PM-1:50 PM

Spring 2022

Instructor: Spencer Chang

Office: Willamette Hall 476
Office Hours: Fr 3-4, M 2:30-3:30 live and via Zoom (link). Feel free to come talk about the course, work on homework problems, chat about my research or anything that interests you.

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Teaching Assistant: Layne Bradshaw (layneb@uoregon.edu (mailto:layneb@uoregon.edu))

TA Office Hours: (link) W 2:30-3:30 in Willamette Hall 453 and via Zoom (link)

Course Description

This course is the third quarter of a three quarter sequence in undergraduate level quantum mechanics.

Learning Outcomes

Through this course, students will learn:

- How to treat identical particles in QM for fermions and bosons
- How to utilize approximation techniques, especially time-independent and time-dependent perturbation to approximately solve for eigenvalues, eigenstates, and time evolution
- How to treat quantum mechanical scattering of particles
How to present a calculation appropriate to a scientific publication and how to present/defend this in a oral presentation

Text and other Course Requirements

The textbook for this course is "Introduction to Quantum Mechanics" 3rd edition by Griffiths and Schroeter. Older editions are not guaranteed to have the same content or homework questions. If you are interested in additional references for further reading or alternative presentations, please let me know.

Workload and Grading Policy

There will be homework assignments offered roughly weekly, with about six-seven total, including one that might be due during Dead Week. These will comprise 60% of your grade and the due date will be determined in class. There will be no exam in the course, the rest of the grade, 40%, will be determined by a final project and oral exam/presentation. The project will involve an advanced QM calculation and write up in the style of a paper (worth 25%) and the presentation will be in the style of a seminar/research presentation (worth 15%). Your ultimate grade will be based on your combined score and I reserve both the right to adjust this score by 5% to account for improvements over the quarter as well as to curve the grades if needed to produce a distribution that accurately reflects the performance of the class. In general, please let me know as soon as possible about any issues with turning in a homework on time. Total work expected in a week will be 3 hours of reading, 3-6 hours on the homework, and 3 hours of lecture.

Course schedule

The plan is to cover chapters 5.1, 7, 8 and parts of 10 and 11 of Griffiths. Class will be primarily lecture based, but questions and discussion are highly encouraged.

Collaboration Policy

Discussion with classmates on homework is encouraged and let me know if you would like help in facilitating study groups. However, students must submit their own work. The homework is essential to learning the subject, thus it is more important to understand the methods than the final answers. Use of online
homework solutions and other academic misconduct will not be tolerated. Please see the University Student Conduct Code (http://conduct.uoregon.edu) for more information.

**Electronics Policy**

Humans are terrible multi-taskers and this is even more the case with remote teaching, I encourage everybody to limit the use of technology to streaming the lectures, note taking and recording of lectures. Using full screen for the Zoom lectures and turning off notifications can be helpful in focusing on the class.

**Class Environment**

Our aim is to make the classroom an inclusive environment where all are welcome to discuss and ask questions **while** maintaining proper respect for all participants. In particular, be conscious of the way we address each other and give space to others to be listened to and heard. Please see the UO physics department's code of conduct (http://physics.uoregon.edu/physics-department-code-of-conduct) for more information.

**Accessibility**

If there are any potential issues, please let me know if there are anyways the course can be made more accessible.

**Student Input**

I welcome student input on all aspects of the course, including best practices for remote teaching, time spent in class (lecture, activities, Q&A), date and time of homework deadline, format of exams (open book vs. notes), and/or replacing an exam with a presentation/paper. Happy to receive this directly through email or Zoom.

**COVID Policies and Best Practices**

**Academic Disruption**

*In the event of a campus emergency that disrupts academic activities, course requirements, deadlines, and grading percentages are subject to change. Information about changes in this course will be communicated as soon as possible by email, and*
on Canvas. If we are not able to meet face-to-face, students should immediately log onto Canvas and read any announcements and/or access alternative assignments. Students are also expected to continue coursework as outlined in this syllabus or other instructions on Canvas.

In the event that the instructor of this course has to quarantine, this course may be taught online during that time.

**COVID Containment Plan for Classes**

As the University of Oregon returns to in-person instruction, the key to keeping our community healthy and safe involves **prevention**, **containment**, and **support**. Here is information critical to how the UO is responding to COVID-19.

- **Prevention**: To prevent or reduce the spread of COVID-19 in classrooms and on campus, all students and employees must:
  - Comply with [vaccination policy](https://coronavirus.uoregon.edu/vaccine)
  - **Wear face coverings** ([https://coronavirus.uoregon.edu/prevention#face-coverings](https://coronavirus.uoregon.edu/prevention#face-coverings)) in all indoor spaces on UO campus
  - Complete weekly **testing** ([https://coronavirus.uoregon.edu/testing](https://coronavirus.uoregon.edu/testing)) if not fully vaccinated or exempted
  - **Wash hands** ([https://coronavirus.uoregon.edu/prevention#healthy-hand-washing](https://coronavirus.uoregon.edu/prevention#healthy-hand-washing)) frequently and practice social distancing when possible
  - Complete daily **self-checks** ([https://coronavirus.uoregon.edu/prevention#health-checks](https://coronavirus.uoregon.edu/prevention#health-checks))
  - Stay home/do not come to campus if feeling [symptomatic](https://coronavirus.uoregon.edu/prevention#if-sick-stay-home)
  - Complete the UO [COVID-19 case and contact reporting form](https://oregon.qualtrics.com/jfe/form/SV_6lfKVJkJE0jAGPvn) if you test positive or have been in close contact with a confirmed or presumptive case.

- **Containment**: If a student in class tests positive for COVID-19, all relevant classes will be notified via an email by the Corona Corps Care Team with instructions for students and staff based on their vaccination status. Specifically:
  - **Vaccinated and Asymptomatic students**: Quarantine not required, but daily self-monitoring before coming on campus is advised; sign up for testing through
MAP 3-5 days after exposure if advised you are a contact.”

- **Unvaccinated or partially vaccinated students**: 14-day quarantine advised – do not come to class – and sign up for testing 3-5 days after notification through [MAP](https://coronavirus.uoregon.edu/map-testing), if asymptomatic, or through University Health Services (541-346-2770) or your primary care provider, if symptomatic.

- **Symptomatic students**: stay home (do not come to class/campus), complete the online [case and contact form](https://oregon.qualtrics.com/jfe/form/SV_6lfKVJkE0jAGPvn), and contact University Health Services (541-346-2770) or your primary care provider to arrange for immediate COVID-19 testing.

Students identified as a close contacts of a positive case will be contacted by the Corona Corps Care Team (541-346-2292).

- **Support**: The following resources are available to you as a student.
  - [University Health Services](https://health.uoregon.edu/) or call (541) 346-2770
  - [University Counseling Center](https://counseling.uoregon.edu/) or call (541) 346-3277 or (541) 346-3227 (after hrs.)
  - [MAP Covid-19 Testing](https://coronavirus.uoregon.edu/testing#students)
  - [Corona Corps](https://coronavirus.uoregon.edu/corona-corps) or call (541) 346-2292
  - [Academic Advising](https://advising.uoregon.edu/) or call (541) 346-3211
  - [Dean of Students](https://dos.uoregon.edu/) or call (541)-346-3216

**Good Classroom Citizenship**

- Wear your mask and make sure it fits you well
- Stay home if you’re sick
- Get to know your neighbors in class, and let them know if you test positive
- Get tested regularly
- Watch for signs and symptoms with the daily symptom self-check
- Wash your hands frequently or use hand sanitizer