Course Syllabus

PHYS 415: Quantum Mechanics

Zoom Lectures and Office Hours, *Link in Canvas Zoom Meetings Tab*

MW 12:00PM-1:50 PM
Winter 2022
Instructor: Spencer Chang

Office: Willamette Hall Room 476
Office Hours: M, 2:30-3:30 and F 3-4 via the following Zoom link [https://uoregon.zoom.us/j/2162101610](https://uoregon.zoom.us/j/2162101610) or by appointment. If you would like to attend in person, send me an email. Feel free to come talk about the course, work on homework problems, chat about my research or anything that interests you.

E-mail: chang2@uoregon.edu (mailto:chang2@uoregon.edu)

Teaching Assistant: Maxx Miller (maxxm@uoregon.edu (mailto:maxxm@uoregon.edu))

TA Office Hours:  [https://uoregon.zoom.us/j/92954111646](https://uoregon.zoom.us/j/92954111646) W 2:30-3:30 at the following Zoom link [https://uoregon.zoom.us/j/98806116200?pwd=S0s5NXh6Sit5RmxsMHBYYWW81bW5VUT09](https://uoregon.zoom.us/j/98806116200?pwd=S0s5NXh6Sit5RmxsMHBYYWW81bW5VUT09)

Course Description

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

Learning Outcomes

Through this course, students will learn:

- How to treat spherically symmetric problems in quantum mechanics (in particular the Hydrogen atom), by using spherical coordinates and separation of variables
• How to utilize angular momentum states including spin and how to combine angular momentum states
• How to identify symmetries (e.g. translational, rotational, etc...) in quantum mechanics and determine their implications for conservation and representation of states

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 eight total, including one due during Dead Week. These will comprise 60% of your grade and the due date will be determined in class. For exams, there will be a final exam worth 25% and based on the class preference there will be a midterm or a presentation worth 15%. Your ultimate grade will be based on this composite 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. Due to remote teaching, assignment deadlines are flexible, however late homework will not be accepted without prior arrangement. 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 most of chapters 4 and 6 of Griffiths, as well as the EPR paradox and Bell's inequality. 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](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. Also, anonymous surveys can be set up at any moment but will at least be done in the middle of the quarter to get your feedback.
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) in all indoor spaces on UO campus
  - Complete weekly testing (https://coronavirus.uoregon.edu/testing) if not fully vaccinated or exempted
  - Wash hands (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)
  - 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_6lfKVJkE0jAGPvn) 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_6lfKJVkJE0jAGPvn), 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

**Course Summary:**

<table>
<thead>
<tr>
<th>Date</th>
<th>Details</th>
<th>Due</th>
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<td>Mon Jan 3, 2022</td>
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