

Physics 215, Introduction to Non-Relativistic Quantum Mechanics

Winter, 2024

Instructor: Stefania Gori

Office: ISB # 322

Contact E-mail: sgori@ucsc.edu

Classroom and time: ISB 231, Tuesday & Thursday, 5.20pm - 6.55pm

Office Hours: Wednesday, 10:00am-11:00am or by appointment (please contact me!)

either in my office, or in zoom:

<https://ucsc.zoom.us/j/2708646231>, Passcode: s.gori

Course website: I will post all material on Canvas

- **Textbook and material:**

Textbooks: *Modern Quantum Mechanics, third edition*,
J.J. Sakurai and Jim Napolitano.

Principles of Quantum Mechanics, second edition,
R. Shankar.

- **Topics and tentative schedule (likely subject to change):**

- * Week 1: Mathematical introduction [Shankar, Chapter 1]
- * Week 2: Postulates of quantum mechanics [Shankar, Chapter 4]
- * Week 3: Quantum dynamics [Sakurai and Napolitano, Chapter 2.1, 2.2, 3.4] + The harmonic oscillator [Sakurai and Napolitano, Chapter 2.3; Shankar, Chapter 7];
- * Week 4: Further aspects of quantum mechanics in one dimension [Sakurai and Napolitano, Chapter 2.4 and 2.5; Shankar, Chapter 5]
- * Week 5: Scattering in one dimension [Shankar, Chapter 5]
- * Week 6: Symmetries in quantum mechanics [Sakurai and Napolitano, Chapter 4; Shankar, Chapter 11]

- * Week 7: Angular momentum in quantum mechanics [Sakurai and Napolitano, Chapter 3.1–3.3, 3.5, 3.6; Shankar, Chapter 12]
- * Week 8: Rotationally invariant problems in three dimensions [Sakurai and Napolitano, Chapter 3.7 and Appendix B.5; Shankar, Chapter 12]
- * Week 9: The hydrogen atom; addition of angular momentum [Sakurai and Napolitano, Appendix B.6 and Chapter 3.8; Shankar, Chapter 13 and Chapter 15]
- * Week 10: Review and “leftovers”

- **Homework and exams:**

Five homework sets will be assigned during the quarter. They will be posted on **Canvas** and are due three classes afterwards (Thursday to Tuesday). Collaboration on homework assignments is encouraged, but each student must submit their own original writeup. There will be a midterm exam (on February 13 during class time) and a final exam in the week of March 18-22 (the University scheduled our exam on March 20 at 7:30pm-10:30pm...).

The tasks and their relative weights are given below:

- ★ 30%: homework
- ★ 30%: midterm exam
- ★ 40%: final exam

The minimal score not to fail the class is $\geq 50\%$.

- **DRC**

UC Santa Cruz is committed to creating an academic environment that supports its diverse student body. If you are a student with a disability who requires accommodations to achieve equal access in this course, please submit your Accommodation Authorization Letter from the Disability Resource Center (DRC) to me privately during my office hours or by appointment, as soon as possible in the academic quarter, preferably within 1 week. I also encourage you to discuss with me ways we can ensure your full participation in this course. I encourage all students who may benefit to learn about the DRC and the UCSC accommodation process. You can visit the DRC website at drc.ucsc.edu. You can make an appointment and meet in-person with a DRC staff member. The phone number is 831-459-2089, or email drc@ucsc.edu.

- **Title IX**

Please be aware that under the UC Policy on Sexual Violence and Sexual Harassment, faculty and student employees (including Teaching Assistants, Readers, Tutors, etc.) are “responsible employees” and are required to notify the Title IX Officer of any reports of incidents of sexual harassment and sexual violence (sexual assault, domestic and dating violence, stalking, etc.) involving students. Academic freedom exceptions exist for disclosures made within a class discussion or assignment related to course content; under those conditions only, a report to the Title IX Officer is not required. The Campus Advocacy Resources and Education (CARE) Office (831) 502-2273, care@ucsc.edu can provide confidential support, resources, and assist with academic accommodations. To make a Title IX report, please contact the Title IX Office at (831) 459-2462, website: <https://titleix.ucsc.edu/>. The Title IX office can also assist with academic, housing, work, and transportation adjustments and implement interim and safety measures.

- **Academic integrity**

By enrolling in the university, students are automatically agreeing to abide by policies, including those on academic misconduct. Academic integrity and scholarship are core values that should guide our conduct and decisions as members of the UCSC community. Plagiarism and cheating contradict these values, and so are very serious academic offenses. Penalties can include a failing grade in an assignment or in the course, or suspension or expulsion from the university. Please see the university’s Rules of Conduct regarding student conduct and discipline: <http://deanofstudents.ucsc.edu/student-conduct/student-handbook/pdf/100.0-code-of-student-conduct.pdf>.

- **CARE**

UCSC Campus Advocacy, Resources & Education (CARE) believes that all people deserve to live and engage in an environment free from violence. We believe in promoting an environment where people can learn and work while being safe and healthy. We celebrate the differences on this campus and believe in working collectively to create a community that is free from violence, exploitation, and harassment and instead promotes safety and equity. For an appointment, call 831-502-2273 or email care@ucsc.edu.

- **Physics department statement regarding diversity and inclusion**

As a community, we acknowledge the richness of commonalities and differences we share, the intrinsic worth of all who work and study here, and that physics education is enhanced by investigation of and reflection upon multiple perspectives. We also aspire to create respect for and appreciation of all persons as a key characteristic of our campus community and to achieve an environment that welcomes and supports diversity as well as ensuring full educational opportunities for all who teach and learn here. This work is essential to furthering the widely shared purposes of maintaining our premier status, noted for its excellence, richness and vibrancy. We are thus deeply committed to ensuring the continued diversity of our campus and will do whatever we can, legally and appropriately, to preserve and expand the diverse nature of our community.