
Introduction to Quantum Mechanics

*Department of Physics and Astronomy
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- **Instructor: Prof. Marcel Franz**

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- **Teaching Assistants:**

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- **Lectures**

Lectures are held 9:30 - 11:00 Tue & Th in MacLeod 228.

- **Textbook**

“Introduction to Quantum Mechanics” by D. J. Griffiths, second edition, (*Cambridge University Press* 2016). The course will cover chapters 1-5 and additional material presented in class.

- **Other useful texts**

“Quantum Physics” by S. Gasiorowicz, (*Wiley* 1996)
“Quantum Mechanics” by C. Cohen-Tannoudji, B. Diu, and F. Laloe, (*Wiley* 1977)
“Principles of Quantum Mechanics” by R. Shankar, (*Kluwer* 1994).

- **Course Description:** Together with the Einstein’s theory of relativity quantum mechanics constitutes one of the fundamental pillars of modern physics. Quantum mechanics provides the description of phenomena on atomic and subatomic lengthscales where particles behave like waves and wave phenomena acquire particle-like attributes. In many instances such quantum behavior is manifested on much larger lengthscales and becomes directly observable in our everyday lives (lasers, semiconductors, superconducting devices).

This course will provide a rigorous introduction into the world of quantum phenomena. We shall introduce the wavefunction description of matter, and the Schrödinger equation governing the behavior of the wavefunction. We shall discuss its interpretation and find solutions for a number of interesting situations such as the particle in a well, harmonic oscillator and the hydrogen atom. Understanding the principles of quantum mechanics involves learning considerable amount of mathematical formalism. Thus, although we shall not need any truly complicated math, working knowledge of calculus, basic differential equations, and elements of linear algebra will be expected.

- **Course webpage:** www.physics.ubc.ca/~franz/phy304.html

Please check frequently for homework assignments, practice problem sets, and other important course announcements.

- **Office Hours:** Tue 11:00-12:00, We 14:00-15:00 and by appointment. Additional office hours will be posted before the exams.
- **Homework:** You learn QM by working out problems, not by memorizing books or notes. Problem sets will be assigned on weekly basis in class and will be in addition posted on the course webpage, along with solutions (posted after the due date). To access solutions you will need the following login info, userid: **Pauli** password: **matrix**. You are encouraged to discuss the homework problems with fellow students but you must turn in your own work. Use of any solution manuals, found online or elsewhere, is strictly prohibited.

Homework must be handed in *in person* by the end of the lecture on the due date. Scanned homework is accepted via email on *exceptional basis* only. You must accompany any such submission by an explanation why you could not come to class. If no acceptable explanation is given the homework will be rejected.

LATE HOMEWORK POLICY: Homeworks handed in after the deadline will have their score reduced by a factor $(1 - t/T)$ where t is the time past due in hours and $T = 24\text{h}$. After 24 hours solutions are posted on the course website and no more homeworks are accepted.

IMPORTANT NOTE: For all late homeworks responsibility lies with the student to hand-deliver the later to the instructor or course TA and have it time-stamped. There is no guarantee that the instructor or TA will be available to accept the homework outside the lectures and office hours and no other person is authorized to do this. If you leave your paper in the mailbox or under the door it will be time-stamped when found. *It is best to hand assignments on time!*

- **Practice problems:** A list of additional useful problems will be given to help you further sharpen your understanding of the subject and your problem solving skills. You are not required to do these problems, although you may find it useful to do so.

- **Exams and Grades**

Homework	20%
Midterms	40%
Final Exam	40%

- The exam dates and scope will be announced in class. Two midterms are tentatively planned for mid October and mid November and will cover chapters 1-2 and 3-4 respectively plus any extra material discussed in class. Final exam covers all the material discussed in the course.
- The exams are closed book, closed notes. You may bring a *one page formula sheet* to the exam. Calculators are permitted but not essential.
- It is generally *very difficult* to give fair make-up exams. If you have to miss an exam because of an absolutely unavoidable and legitimate cause (e.g. medically certified illness), arrangements will be made on the case-by-case basis. The most likely alternative will be an oral exam or determination of the final grade without the missed exam (as long as this is not final exam).