

Course Syllabus

PC 321: Quantum Mechanics 1

Department of Physics and Computer Science, Faculty of Science, Waterloo

Fall | 2019

Instructor Information

Dr. Shohini Ghose | N20176H (Science Building)

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Weekly Office Hours: Tuesdays 4pm – 5pm or By Appointment

Course Information

PC 321: Quantum Mechanics I

TR 2:30pm – 3:50pm, N1058

Pre-requisites : PC242, MA205

Course Overview and Approach

What it's all about: This course provides a detailed introduction to the theory of quantum mechanics – one of the most successful and well-tested theories in physics. You will learn the formalism of quantum mechanics, the mathematical tools and techniques required to actually tackle realistic problems as well as discuss foundational and interpretational questions that are still debated today.

Topics we will tackle:

- Probability in quantum mechanics
- Description of quantum states: the wave function
- Evolution of quantum states: the Schrodinger equation
- Measuring quantum states: Hilbert space, observables and operators
- Quantum shorthand: Dirac notation
- The essential quantum problem: the hydrogen atom revisited
- Digging deeper: angular momentum

Course Tools and Learning Materials

- D. J. Griffiths, [Introduction to Quantum Mechanics](#), 2nd Edition, Pearson.
- [Library e-reserve website and access information](#)

Note: Audio or video recording and/or broadcasting of the lectures is not permitted without prior approval of the instructor.

The educational materials developed for this course, including, but not limited to, lecture notes and slides, handout materials, examinations and assignments, and any materials posted to MyLearningSpace, are the intellectual property of the course instructor. These materials have been developed for student use only and they are not intended for wider dissemination and/or communication outside of a given course. Posting or providing unauthorized audio, video, or textual material of lecture content to third-party websites violates an instructor's intellectual property rights, and the Canadian Copyright Act. Recording lectures in any way is prohibited in this course unless specific permission has been granted by the instructor. Failure to follow these instructions may be in contravention of the university's Code of Student Conduct and/or Code of Academic Conduct, and will result in appropriate penalties. Participation in this course constitutes an agreement by all parties to abide by the relevant University Policies, and to respect the intellectual property of others during and after their association with Wilfrid Laurier University.

Student Evaluation

Assessment	Weighting	Date
Assignments	30%	Due date will be indicated when each assignment is posted
Midterm exam	30%	October 29, in class
Final Exam/Project	40%	Last week of class. More information will be posted on MLS

University and Course Policies

1. **Special Needs:** Students with disabilities or special needs are advised to contact Laurier's Accessible Learning Centre for information regarding its services and resources. Students are encouraged to review the [Academic Calendar](#) for information regarding all services available on campus.
2. **Plagiarism:** Wilfrid Laurier University uses software that can check for plagiarism. If requested to do so by the instructor, students are required to submit their written work in electronic form and have it checked for plagiarism.

Academic Integrity: Laurier is committed to a culture of integrity within and beyond the classroom. This culture values trustworthiness (i.e., honesty, integrity, reliability), fairness, caring, respect, responsibility and citizenship. Together, we have a shared responsibility to uphold this culture in our academic and nonacademic behaviour. The University has a defined policy with respect to academic misconduct. As a Laurier student you are responsible for familiarizing yourself with this policy and the accompanying penalty guidelines, some of which may appear on your transcript if there is a finding of misconduct. The relevant policy can be

found at Laurier's [academic integrity](#) website along with resources to educate and support you in upholding a culture of integrity. Ignorance is not a defense.

3. **Classroom Use of Electronic Devices:** Use of laptops is permitted for taking lecture notes during class (provided they do not disturb other students) but not during exams. Cell phones should be turned off during class and during exams. For further information see [Policy 9.3](#).
4. **Late Assignment Policy:** Late assignments will in general not be accepted. If you miss a deadline due to illness, please provide a doctor's note.
5. **Final Examinations:** Students are strongly urged not to make any commitments (i.e., vacation) during the examination period. Students are required to be available for examinations during the examination periods of all terms in which they register.
6. **Foot Patrol, the Wellness Centre, and the Student Food Bank:**

Multi-campus Resource:

- Good2Talk is a postsecondary school helpline that provides free, professional and confidential counselling support for students in Ontario. Call 1-866-925-5454 or through 2-1-1. Available 24-7.

Kitchener/Waterloo Resources:

- [Waterloo Student Food Bank](#): All students are eligible to use this service to ensure they're eating healthy when overwhelmed, stressed or financially strained. Anonymously request a package online 24-7. All dietary restrictions accommodated.
- [Waterloo Foot Patrol](#): 519.886.FOOT (3668). A volunteer operated safe-walk program, available Fall and Winter daily from 6:30 pm to 3 am. Teams of two are assigned to escort students to and from campus by foot or by van.
- [Waterloo Student Wellness Centre](#): 519-884-0710, x3146. The Centre supports the physical, emotional, and mental health needs of students. Located on the 2nd floor of the Student Services Building, booked and same-day appointments are available Mondays and Wednesdays from 8:30 am to 7:30 pm, and Tuesdays, Thursdays and Fridays from 8:30 am to 4:15 pm. Contact the Centre at x3146, wellness@wlu.ca or @LaurierWellness. After hours crisis support available 24/7. Call 1-844-437-3247 (HERE247).

Brantford Resources:

- [Brantford Student Food Bank](#): All students are eligible to use this service to ensure they're eating healthy when overwhelmed, stressed or financially strained. Anonymously request a package online 24-7. All dietary restrictions accommodated.
- [Brantford Foot Patrol](#): 519-751-PTRL (7875). A volunteer operated safe-walk program, available Fall and Winter, Monday through Thursday from 6:30 pm to 1 am; Friday through

Sunday 6:30 pm to 11 pm. Teams of two are assigned to escort students to and from campus by foot or by van.

- [Brantford Wellness Centre](#): 519-756-8228, x5803. Students have access to support for all their physical, emotional, and mental health needs at the Wellness Centre. Location: Student Centre, 2nd floor. Hours: 8:30 am to 4:15 pm Monday through Friday. After hours crisis support available 24/7. Call 1-884-437-3247 (HERE247).