

PHYB56H3 F

Introduction to Quantum Physics

Fall 2023 Syllabus

Course Meetings

PHYB56H3 F

Section	Day & Time	Delivery Mode & Location
LEC01	Tuesday, 9:00 AM - 11:00 AM	In Person: BV 363
TUT0001	Wednesday, 9:00 AM - 11:00 AM	In Person: IC 328
TUT0002	Wednesday, 3:00 PM - 5:00 PM	In Person: SW 311

Refer to ACORN for the most up-to-date information about the delivery and location of the course meetings.

Course Contacts

Course Website: <https://q.utoronto.ca/courses/311744>

Instructor:

problems; by familiarizing yourself with the workings of the theory in these contexts you will be well-prepared for a further study in which these same principles help you understand, in richer detail, the properties of objects like atoms, molecules, metals, lasers, the cosmos, etc. Along the way, I hope you will gain an appreciation for QM's intriguing combination of simplicity and weirdness.

Course Learning Outcomes

By the end of the course, you will be able to:

- Identify and define the basic vocabulary used in Quantum Physics.
- Recognize the experimental evidence that led to the revision of Classical Physics and the development of Quantum Mechanics.
- Understand conceptually and illustrate with experimental examples the main differences between the quantum and classical paradigms.
- Apply the basic ideas of Quantum Mechanics to the study and analysis of one-dimensional models.
- Develop and implement problem-solving strategies and apply the appropriate mathematical tools useful in the analysis of examples and questions related to the description, behaviour, and evolution of systems under the one-dimensional Schrödinger equation.
- Identify the main ideas and core physical principles in Quantum Mechanics, and demonstrate that knowledge in the context of questions and problems in tutorial work, tests, and the final exam.
- Be well-prepared for a further study of Quantum Mechanics, its application to real-world problems and its relationship to other areas of physics.

Prerequisites: PHYA21H3 and [MATA36H3 or MATA37H3]

Corequisites: MATB41H3

Exclusions: PHY256H1, (PHYB25H3)

Recommended Preparation: None

Credit Value: 0.5

Course Materials

- **Calculator:** A scientific, non-programmable and non-graphing calculator is required.
- **Textbook:** Introduction to Quantum Mechanics 3rd edition by David J. Griffiths and Darrell F. Schroeter, Cambridge. ISBN 978-1-107-18963-8
- **Recommended Textbook (not required):** Quantum Mechanics: an Accessible Introduction by Robert Scherrer, Pearson/Addison Wesley. ISBN 0-8053-8716-1. (Note: Material from Ch.1 of Scherrer is required and will be made available via the library. The rest of the book is recommended as a reference, treating some of the same topics as Griffiths but with a different presentation that you may find helpful.)

If the first term test is missed due to a medical, family or similar documented emergency beyond the student's control, the value of the test will be transferred to the second test and the final exam; thus the second test will count for 30% and the final will be 54%. If the second term test is missed for such an emergency reason, a makeup test may be scheduled.

Course Schedule

The following schedule is ~~at~~ and may be adjusted as we proceed through the term. Please pay attention to announcements of any changes in class and on Quercus. Please look at the assigned readings before the associated lecture--- this will allow you to orient yourself and make the most of the material. Some material from the readings may be assumed and not repeated in lecture; some of the more difficult material may be expanded on.

Week	Description
Week 1 Sep 05-06	Why QM? Light, Blackbody Radiation, the Photoelectric Effect Scherrer Ch. 1.1-1.3
Week 2 Sep 12-13	Beginnings of QM:

Week 10 Nov 14-15	The Quantum Harmonic Oscillator I Griffiths Ch. 2.3
Week 11 Nov 21-22	The Quantum Harmonic Oscillator II Griffiths Ch. 2.3
Week 12 Nov 28-29	The WKB Approximation Griffiths Ch. 9.1-9.2

Policies & Statements

Academic Integrity

The University treats cases of cheating and plagiarism very seriously. The University of Toronto's Code of Behaviour on Academic Matters (<http://www.governingcouncil.utoronto.ca/policies/behaveac.htm>) outlines the behaviours that constitute academic dishonesty and the processes for addressing academic offences.

Potential offences in papers and assignments include using someone else's ideas or words without appropriate acknowledgement, submitting your own work in more than one course without the permission of the instructor, making up sources or facts, obtaining or providing unauthorized assistance on any assignment.

On tests and exams, cheating includes using or possessing unauthorized aids, looking at someone else's answers during an exam or test, misrepresenting your identity, or falsifying or altering any documentation required by the University.

Equity, Diversity and Inclusion

The University of Toronto is committed to equity, human rights and respect for diversity. All members of the learning environment in this course should strive to create an atmosphere of mutual respect where all members of our community can express themselves, engage with each other, and respect one another's differences. U of T does not condone discrimination or harassment against any persons or communities.

The University of Toronto is a richly diverse community and as such is committed to providing an environment free of any form of harassment, misconduct, or discrimination. In this course, I seek to foster a civil, respectful, and open-minded climate in which we can all work together to develop a better understanding of key questions and debates through meaningful dialogue. As such, I expect all involved with this course to refrain from actions or behaviours that intimidate, humiliate, or demean persons or groups or that undermine their security or self-esteem based on traits related to race, religion, ancestry, place of origin, colour, ethnic origin, citizenship,

creed, sex, sexual orientation, gender identity, gender expression, age, marital status, family status, disability, receipt of public assistance or record of offences.

University Land Acknowledgement

I wish to acknowledge this land on which the University of Toronto operates. For thousands of years, it has been the traditional land of the Huron-Wendat, the Seneca, and the Mississaugas of the Credit. Today, this meeting place is still the home to many Indigenous people from across Turtle Island and we are grateful to have the opportunity to work on this land.

Accommodations

Students with diverse learning styles and needs are welcome in this course. In particular, if you have a disability/health consideration that may require accommodations, please feel free to approach me and/or the AccessAbility Services Office as soon as possible.

AccessAbility Services staff (located in Rm AA142, Arts and Administration Building) are available by appointment to assess specific needs, provide referrals and arrange appropriate accommodations 416-287-7560 or email ability.utsc@utoronto.ca. The sooner you let us know your needs the quicker we can assist you in achieving your learning goals in this course.

Recording of Classroom Material by Students

Recording or photographing any aspect of a university course - lecture, tutorial, seminar, lab, studio, practice session, field trip etc. – without prior approval of all involved and without approval from the instructor is not permitted.

