QUANTUM PHYSICS 1 SPRING 2023

PHYS 234

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CLASS SCHEDULE

Section	Location	Time	Instructor(s)
PHYS 234 001 *[LEC]*	AL 113	Tuesdays & Thursdays 1 p.m. - 2:20 p.m.	Russell Thompson thompson@uwaterloo.ca
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INSTRUCTOR / TA INFORMATION

Instructors: R. Thompson

Office: PHY 355

Email: thompson@uwaterloo.ca

Office hours: TBA and by appointment

Teaching Assistants: Sanchit Srivastava (s49sriva@uwaterloo.ca); Roger Luo (roger.luo@uwaterloo.ca); Scott Johnston (scott.johnstun@uwaterloo.ca)

COURSE DESCRIPTION

> *Calendar Description for PHYS 234*
>
> Background of quantum physics. Introduction to formalism of quantum physics. Introduction to operators. Quantization, waves, and particles. The uncertainty principle. The Schroedinger equation for one-dimensional problems: bound states in square wells, harmonic oscillator, transmission through barriers. [Note: CS 114, PHYS 236, or knowledge of computational methods is recommended. Offered: W, S]
>
> Prereq: PHYS 112 or 122; One of PHYS 249, MATH 114, 136; One of MATH 128, 138, 148. Coreq: One of MATH 228, AMATH 250, AMATH 251. Antireq: CHEM 356, NE 232, PHYS 233, ECE 405

No class May 23rd (Monday schedule being used).

LEARNING OUTCOMES

By the end of this course students should be able to:

Learn and use fundamental mathematical formalisms and notations of introductory quantum mechanics.

TENTATIVE COURSE SCHEDULE

Week (estimated)	Topics
1	Introduction. The double slit experiment.
2-4	The formalism of quantum mechanics.
5	The postulates of quantum mechanics.
6-10	The time-independent Schrödinger equation for one dimensional problems.
11	Spin.
12	Review.

TEXTS / MATERIALS

Title / Name	Notes / Comments	Required
Introduction to Quantum Mechanics, 3rd edition.	Authors: D. J. Griffiths and D. F. Schroeter ISBN 9781107189638	Yes
Quantum mechanics: A Paradigm Approach	Author: D. H. McIntyre	No
Quantum Mechanics	Authors: Cohen-Tannoudji et al	No
Quantum Mechanics	Authors: Bransden and Joachain	No

Older editions of textbook are acceptable.

STUDENT ASSESSMENT

Component	Value
Test #1 (Tuesday June 6th 1:00-2:00pm in AL 113)	20%
Test #2 (Tuesday July 18th 1:00-2:00pm in AL 113)	20%

Component	Value
Assignments (pass/fail)	5%
Final exam (time and place set by Registrar's office)	55%

Provided both tests are completed, then final grade may be 100% final exam, if this is better.

Assignments: Approximately 5 assignments, pass/fail, to be turned in electronically through course web site. Due dates will be given in class and posted on web site. Late assignments are subject to as much as 10% penalty per day. When grading is complete, no late assignments will be accepted. Students may discuss assignments but should solve them independently.

ASSIGNMENT SCREENING

No assignment screening will be used in this course.

ADMINISTRATIVE POLICY

UNIVERSITY POLICY

Academic integrity: In order to maintain a culture of academic integrity, members of the University of Waterloo community are expected to promote honesty, trust, fairness, respect and responsibility. [Check the Office of Academic Integrity (https://uwaterloo.ca/academic-integrity/) for more information.]

Grievance: A student who believes that a decision affecting some aspect of their university life has been unfair or unreasonable may have grounds for initiating a grievance. Read Policy 70, Student Petitions and Grievances, Section 4 (https://uwaterloo.ca/secretariat/policies-procedures-guidelines/policy-70) . When in doubt, please be certain to contact the department's administrative assistant who will provide further assistance.

Discipline: A student is expected to know what constitutes academic integrity to avoid committing an academic offence, and to take responsibility for their actions. [Check the Office of Academic Integrity (https://uwaterloo.ca/academic-integrity/) for more information.] A student who is unsure whether an action constitutes an offence, or who needs help in learning how to avoid offences (e.g., plagiarism, cheating) or about "rules" for group work/collaboration should seek guidance from the course instructor, academic advisor, or the undergraduate associate dean. For information on categories of offences and types of penalties, students should refer to Policy 71, Student Discipline (https://uwaterloo.ca/secretariat/policies-procedures-guidelines/policy-71) . For typical penalties, check Guidelines for the Assessment of Penalties (https://uwaterloo.ca/secretariat/guidelines/guidelines-assessment-penalties) .

Appeals: A decision made or penalty imposed under Policy 70, Student Petitions and Grievances (https://uwaterloo.ca/secretariat/policies-procedures-guidelines/policy-70) (other than a petition) or Policy 71, Student Discipline (https://uwaterloo.ca/secretariat/policies-procedures-guidelines/policy-71) may be appealed if there is a ground. A student who believes they have a ground for an appeal should refer to Policy 72, Student Appeals (https://uwaterloo.ca/secretariat/policies-procedures-guidelines/policy-72) .

Note for students with disabilities: AccessAbility Services (https://uwaterloo.ca/accessability-services/) , located in Needles Hall, Room 1401, collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with AccessAbility Services at the beginning of each academic term.

Turnitin.com: Text matching software (Turnitin®) may be used to screen assignments in this course. Turnitin® is used to verify that all materials and sources in assignments are documented. Students' submissions are stored on a U.S. server, therefore students must be given an alternative (e.g., scaffolded assignment or annotated bibliography), if they are concerned about their privacy and/or security. Students will be given due notice, in the first week of the term and/or at the time assignment details are provided, about arrangements and alternatives for the use of Turnitin in this course.

It is the responsibility of the student to notify the instructor if they, in the first week of term or at the time assignment details are provided, wish to submit alternate assignment.