

PHYS 4708: Introduction to Quantum Mechanics II - Winter 2022

Mondays and Wednesdays, 14.35-15:55, TBA

<p>Professor: Dr. Seyda Ipek (pronounced Shae-duh E-peck) 3348 HP, seydaipek@cunet.carleton.ca Pronouns: she/her Student hours: Tue and Fri 10.00-11.00am or by appointment</p>	<p>Teaching Assistant TBA</p>
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First and Last day of class: Jan 10 - Apr 11, 2022 (see below for a tentative schedule)

Class website: Brightspace

Book (recommended): *Quantum Physics*, 3rd Edition, Stephen Gasiorowicz, Wiley, 2003.

What you will learn: Perturbation theory, Pauli exclusion principle, more on the hydrogen atom, scattering theory, advanced quantum mechanics topics

Course Assessment

- **Homework (30%)** There will be weekly problem sets. They will be given out on a Wednesday and will be collected the following Wednesday. Late assignments will not be accepted. You are encouraged to work with others, but **the work you turn in must be yours**. Homework is a very important part of your learning. You should use the office hours or contact me if you need help. Read the Homework section of the course webpage for more detailed info.
- **Midterm (30%)** There will be one midterm, *tentatively* scheduled for Feb 28 during class time.
- **Final (40%)** The final exam will be given during the finals week.

Please make yourselves familiar with the Department of Physics academic policies:

<https://research.physics.carleton.ca/current-undergraduate-students/academic-policies>

Deferred final exams will be permitted for documented reasons (illness, injury or other extraordinary circumstances beyond the student's control). For more information, please see Section 4 of the Academic Regulations of the University:

<http://calendar.carleton.ca/undergrad/regulations/academicregulationsoftheuniversity/>

Academic Accommodations

Write to me with any requests for academic accommodation due to pregnancy or religious obligations during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details visit the Equity Services website: <http://www2.carleton.ca/equity/>

The Paul Menton Centre for Students with Disabilities (PMC) provides services to students with Learning Disabilities, psychiatric/mental health disabilities, Attention Deficit Hyperactivity Disorder, Autism Spectrum Disorders, chronic medical conditions, and impairments in mobility, hearing, and vision. If you have a disability requiring academic accommodations, please contact PMC at 613-520-6608 or pmc@carleton.ca for a formal evaluation. If you are already registered with the PMC, contact your PMC coordinator to send me your Letter of Accommodation at the beginning of the term, and no later than two weeks before the first in-class scheduled exam requiring accommodation (if applicable). After requesting accommodation from PMC, meet with me to ensure accommodation arrangements are made.

Tentative Schedule

(Check Brightspace for up-to-date information)

Week 1	Jan 10, Mon: Welcome! Jan 12, Wed	Review of some 4707 concepts Review of some 4707 concepts
Week 2	Jan 17, Mon Jan 19, Wed:	The two-particle system, center-of-mass motion identical particles, Pauli exclusion principle
Week 3	Jan 24, Mon: Jan 26, Wed: PS 1 due	N particles in a box, Fermi gas Degeneracy pressure, neutron stars, black holes
Week 4	Jan 31, Mon Feb 2, Wed: PS 2 due	Band structure in solids, N-particle harmonic oscillator Time-independent perturbation theory
Week 5	Feb 7, Mon Feb 9, Wed: PS 3 due	Stark effect The <i>real</i> hydrogen atom
Week 6	Feb 14, Mon Feb 16, Wed: PS 4 due	The <i>real</i> hydrogen atom The <i>real</i> hydrogen atom
Week X	Feb 21, Mon Feb 23, Wed	<i>Have a nice break!</i>
Week 7	Feb 28, Mon: Midterm Mar 2, Wed:	Good luck! Variational principle, helium atom
Week 8	Mar 7, Mon Mar 9, Wed	Hydrogen molecule Scattering
Week 9	Mar 14, Mon Mar 16, Wed: PS 5 due	Scattering Time dependent perturbation theory
Week 10	Mar 21, Mon Mar 23, Wed: PS 6 due	Time-dependent perturbation theory Radioactive decays
Week 11	Mar 28, Mon Mar 30, Wed: PS 7 due	Radioactive decays Lasers
Week 12	Apr 4, Mon Apr 6, Wed: PS 8 due	Quantum algorithms Quantum algorithms
Week 13	Apr 11, Mon Apr 13, Wed: no class	Wrap-up
Week 14	Apr XX, YYY: Final exam	<i>Good luck!</i>