

## Carleton University Physics Department

### PHYS 4708 – Introduction to Quantum Mechanics II (Winter 2016)

#### Course Outline

**Instructor:** Prof. Heather Logan (logan@physics.carleton.ca, 613-520-2600 x4319, 3324 Herzberg)

**Lecture times:** Mondays and Wednesdays, 2:35–3:55 p.m., in River Building 1200.

**Prerequisites:** PHYS 4707 (Introduction to Quantum Mechanics I). If you do not have the prerequisite, you must contact me to get permission to enrol in this course. Generally prerequisites can be waived only if you have covered comparable course material elsewhere.

**Course web page:** Announcements and homework assignments will be posted at <http://people.physics.carleton.ca/~logan/4708.html>.

**Required Textbook:** *Quantum Physics*, Stephen Gasiorowicz, Wiley (3rd edition), 2003, ISBN: 0-471-05700-2 (the same book was used for PHYS 4707 in Fall 2015). Available at the Carleton Bookstore and Haven Books, and a copy is on reserve at the library.

There is supplementary material for the text at Wiley's student companion site (no password needed), <http://bcs.wiley.com/he-bcs/Books?action=index&itemId=0471057002&bcsId=1533>

**Office hours:** in 3324 Herzberg, days and times to be announced, or by appointment (email me).

**Midterm exam date:** to be announced

#### Assignments and Grade Distribution

##### Homework assignments (40%):

Homework will be assigned every one or two weeks. Assignments will be posted on the course webpage and distributed in class. Solutions will be made available after the homework due date.

**You are encouraged to discuss the homework assignments with your classmates; however, the work you hand in must be your own.** You are also encouraged to consult me when you have questions about the assignments. Please make every effort to complete the homework. Working problems is essential to acquiring a deep understanding of the material and is the best way to prepare for the exams. **Late homework will not be accepted** without an acceptable reason such as illness, test-beams, or conference talks; if something comes up, talk to me as early as possible! (Once I post the solutions, I cannot accept your assignment for marks.)

##### Midterm exam (20%):

There will be one 80-minute midterm exam, given during the lecture period. The midterm exam will be **closed book and closed notes**. A formula sheet will be provided.

##### Final exam (40%):

The final exam will be 3 hours long, given during the final examination period in April. The final exam will be **closed book and closed notes**. A formula sheet will be provided.

In the event that a deferred exam is necessary for a student, that exam will replace only the final exam component of the course mark and will be granted only if adequate term work has been completed (such that it is mathematically possible to pass the course). Inadequate term work constitutes earning less than 10 of the 60 possible term marks.

## Course Content

The course content will be defined by the lectures. I intend to cover:

1. Angular momentum and spin, and their addition (Gasiorowicz Chap. 7 and 10)
2. Time-independent perturbation theory (Chap. 11) and its application to the real hydrogen atom (Chap. 12)
3. Many-particle systems and the exclusion principle (Chap. 13)
4. Time-dependent perturbation theory (Chap. 15)
5. Interaction of charged particles with an electromagnetic field (Chap. 16)
6. Scattering theory (Chap. 19)

## Important University Regulations

For department policies on academic integrity and and academic accommodation, please see: <http://www.physics.carleton.ca/current-undergraduate-students/academic-policies>  
It is your responsibility to read and be familiar with these policies.

You may need special arrangements to meet your academic obligations during the term. For an accommodation request the processes are as follows:

**Pregnancy or religious obligations:** write to me with any requests for academic accommodation 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://carleton.ca/equity/accommodation>.

**Academic accommodations for students with disabilities:** The Paul Menton Centre for Students with Disabilities (PMC) provides services to students with learning disabilities, psychiatric/mental health disabilities, Attention Deficit Hyperactivity Disorder (ADHD), autism spectrum disorders, chronic medical conditions, and impairments in mobility, hearing, and vision. If you have a disability requiring academic accommodations in this course, please contact PMC at 613-520-6608 or [pmc@carleton.ca](mailto: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 test or exam requiring accommodation (if applicable). After requesting accommodation from PMC, **you must meet with me** to ensure accommodation arrangements are made. Please consult the PMC website for the deadline to request accommodations for the formally-scheduled exam (if applicable).

**Policy regarding missed term work:** If you miss an assignment or the midterm exam for unforeseen medical reasons, you must contact me with documentation within three (3) working days of your return to normal capabilities in order for accommodations and/or a deferred midterm exam to be arranged. The midterm exam can only be replaced by a deferred midterm and will not be waived. Retroactive accommodations will not be granted. You can probably guess why this clause is here. :(