

Quantum Mechanics II: AM/Phys 4251a
Fall 2014
The University of Western Ontario

Instructor: Colin Denniston, cdennist@uwo.ca, office: MC266. If you wish to contact your instructor, please send an email **using your Western email address** and include *4251* in the subject line.

Class time: 11:30am-12:30pm MWF in P&AB-117.

Prerequisite Requirements: Unless you have either the prerequisites for this course or written special permission from your Dean to enroll in it, you may be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites. The prerequisite for this class is Phys 3200 (Note that AM4251 and Phys4251 are antirequisites as they are the same course).

Accessibility: Please contact the course instructor if you require lecture or printed material in an alternate format or if any other arrangements can make this course more accessible to you. You may also wish to contact Services for Students with Disabilities (SSD) at 661-2111 ext. 82147 if you have questions regarding accommodation.

Support Services: Learning-skills counsellors at the Student Development Centre (<http://www.sdc.uwo.ca>) are ready to help you improve your learning skills. They offer presentations on strategies for improving time management, multiple-choice exam preparation/writing, textbook reading, and more. Individual support is offered throughout the Fall/Winter terms in the drop-in Learning Help Centre, and year-round through individual counselling.

Students who are in emotional/mental distress should refer to Mental Health@Western (http://www.health.uwo.ca/mental_health) for a complete list of options about how to obtain help.

Additional student-run support services are offered by the USC, <http://westernusc.ca/services>.

The website for Registrarial Services is <http://www.registrar.uwo.ca>.

Course Website: Students should check OWL (<http://owl.uwo.ca>) on a regular basis for news and updates. This is the primary method by which information will be disseminated to all students in the class. The missing of critical information due to your failure to check OWL cannot be used as a basis for appeal.

Course Materials: The required textbook is *A Modern Approach to Quantum Mechanics, 2nd edition*, by John S. Townsend. Copies are available at the Western Bookstore. Assignments, supplemental information, and references will be posted on the course website.

Course Objectives: Neils Bohr once said, “Those who are not shocked when they first come across quantum theory cannot possibly have understood it.” In this course we hope to be shocked and amazed by quantum theory but to gain understanding by applying it to concrete examples.

Anticipated Topics: Lecture topics are centered on the key objectives of the course. The topic coverage shown below is only approximate and may change depending on lecture progress.

1. STERN-GERLACH EXPERIMENTS
2. ROTATION OF BASIS STATES AND MATRIX MECHANICS
3. ANGULAR MOMENTUM
4. TIME EVOLUTION
5. A SYSTEM OF TWO SPIN-1/2 PARTICLES
6. WAVE MECHANICS IN 1D (REVIEW)
7. HARMONIC OSCILLATOR (1D)
8. TRANSLATIONAL AND ROTATIONAL SYMMETRY IN THE TWO-BODY PROBLEM
9. BOUND STATES OF CENTRAL POTENTIALS
10. TIME-INDEPENDENT PERTURBATIONS
11. IDENTICAL PARTICLES

Course Evaluation: Your grade will be the better of:

I: 30% Assignments, 30% Midterm Exam, 40% Final Exam

OR: II: 30% Assignments, 70% Final Exam

Option II is only available if you show up and take the Midterm Exam or have a valid reason for missing it, as determined by the Faculty of Science Dean's office (see below). The **anticipated date of the Midterm exam is 29 October**, and possibly in the evening (We will firm up the time later with a doodle poll to minimize conflicts, but the exam will be 2.5 hours long).

There will be six assignments of similar weight (one every 2 weeks). No assignments will be dropped from your grade for any reason (If you are sick and the solutions have already been given out or discussed in class, you will have to do a different make-up assignment). Late assignments will be penalized at a rate of 10% per day.

Assignments must ...

- be completed independently. Students may not obtain "help" from the problem solutions of another student in this or any previous class here at Western or any other university, or from any "answer key" from the internet. Students may discuss the problems to help each other, but **NOT** by simply lending solutions. The final solution must be your own work;
- provide complete solutions, including clear explanations and analysis;
- be completed using neat handwriting or typed;
- have each problem beginning on a new page;
- be submitted in person (problem sets submitted electronically or slid under my office door will not be accepted unless specifically arranged with the instructor);
- be stapled together in one group (unstapled assignments are only guaranteed to have the first page marked). Do not submit your assignment in a plastic "envelope".

Calculator Policy: For the exams it is likely you will need a scientific calculator (with log, trig functions), pen and pencil. These will not be provided and if you forget them you will probably fail the exam. However, you cannot use anything capable of wireless communication, or

anything capable of storing and displaying large text files. If you are not sure if your calculator is ok, go to www.staples.ca web site, type “scientific calculator” into the search bar and any one of the calculators that come up costing less than \$15 is ok. Make sure you know how to use the calculator before the exam.

Academic Accommodation Due to Illness: It is Faculty of Science policy that a student who chooses to write a test or exam deems themselves fit enough to do so, and the student must accept the mark obtained. Claims of medical, physical, or emotional distress after the fact will not be considered.

If you are unable to meet a course requirement due to illness or other serious circumstances, you must provide valid medical or supporting documentation to the Academic Counselling Office of your home faculty as soon as possible.

If you are a science student, the Academic Counselling Office of the Faculty of Science is located in WSC 191, and can be contacted at 519-661-3040 or scibmsac@uwo.ca. Their website is http://www.uwo.ca/sci/undergrad/academic_counselling/index.html.

A student requiring academic accommodation due to illness must use the Student Medical Certificate (https://studentservices.uwo.ca/secure/medical_document.pdf) when visiting an off-campus medical facility.

For further information, please consult the university’s medical illness policy at http://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_medical.pdf.

There are no make-up tests. If your faculty’s Academic Counselling Office has approved your circumstances, the value of the missed test will be reallocated as described on the previous page.

If you miss the Final Exam, contact your faculty’s Academic Counselling Office as soon as possible. They will assess your eligibility to write the Special Exam (the name given by the university to a makeup Final Exam) in May of 2015.

You may also be eligible to write the Special Exam if you are in a “Multiple Exam Situation” (see http://www.registrar.uwo.ca/examinations/exam_schedule.html).

Academic Integrity: Students must write their essays and assignments in their own words. Whenever students take an idea, or a passage from another author, they must acknowledge their debt both by using quotation marks where appropriate and by proper referencing such as footnotes or citations. Plagiarism is a major academic offence.

All required papers may be subject to submission for textual similarity review to the commercial plagiarism-detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com (<http://www.turnitin.com>).

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at this website: http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf.