

COURSE NO: PHYS 4386 Quantum Mechanics 3

Web Site: <http://drop.physics.umanitoba.ca/~jsirker>

LECTURES

Dr. J. Sirker Tel: 474-6192	Mo/We/Fr 8:30 a.m. office: 515 Allen Bldg email: sirker@physics.umanitoba.ca	Synchronous online course Consultation Times: by appointment
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REQUIRED TEXTBOOKS & MATERIALS

There are no required textbooks for this course. Lecture notes will be posted online.

Course Technological Requirements

Students enrolled in the course must ensure they satisfy the following minimum technological requirements:

- A computing device where one can create and edit documents,
- An internet connection capable of zoom meetings, streaming videos and downloading software, and
- Access to a web-cam and microphone.

ASSIGNMENTS

Homework problems will be assigned on a regular basis (usually every two to three weeks) and collected by email for marking (usually one week later). In addition, there will also be two in-class problems which will be collected by email for marking at the end of the class.

EVALUATION PROCEDURE:

Assignments:	40%
In-class problems:	30%
Final take-home exam:	30%
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Total	100%

The schedule of assignments, in-class problems, and the final project are detailed below. The marks of the assignments, in-class problems, and the final exam will be made available within one week after submission. A sufficient percentage of the total mark will be provided to the students before the Voluntary Withdrawal deadline. The final grades will be submitted to Aurora by the grade submission deadline.

The preliminary low-numerical-boundaries for the letter grades:

A+	90%
A	85%
B+	79%
B	72%
C+	65%
C	55%
D	50%
F	Below 50%

Note that the final numerical boundary for each letter grade may be adjusted depending on the total mark distribution of the class. No student's final grade will be reduced due to the boundary adjustment.

SCHEDULE OF ASSIGNMENTS AND FINAL EXAM:

4 assignments	(every two to three weeks)
2 in-class problems	(at suitable times)
Final exam	Take-home exam in December

POLICY ON LATE ASSIGNMENTS

Late assignments will be penalized 10% of the total mark per day overdue for a maximum penalty of 30% for 3 days overdue, unless a satisfactory reason for the delay is given. No submissions will be accepted more than 3 days after the submission deadline.

Professional Conduct

We recognize that these are unusual circumstances, and some adjustments need to be made when working virtually. At the same time, we do want to remind you that University policies, such as the **Respectful Work and Learning Environment policy**, still apply, as do basic expectations around how students will engage with each other and all members of the University. This means that when participating in classes, online meetings, etc., students are expected to behave professionally, and follow the same basic norms as they would in person, such as being properly clothed, not being impaired, and participating respectfully. **Essentially, if you wouldn't do it in an in-person class, don't do it in a virtual setting.**

Please familiarize yourself with the [UM Respectful Work and Learning Environment \(RWLE\)](#)

Section 2.5(c) of the [Student Non-Academic Misconduct and Concerning Behaviour Procedure](#) describes types of inappropriate or disruptive behaviour.

Student Accessibility Services:

The University of Manitoba is committed to providing an accessible academic community. [Students Accessibility Services \(SAS\)](#) offers academic accommodation supports and services such as note-taking, interpreting, assistive technology and exam accommodations. Students who have, or think they may have, a disability (e.g. mental illness, learning, medical, hearing, injury-related, visual) are invited to contact SAS to arrange a confidential consultation.

Student Accessibility Services
520 University Centre
Phone: (204) 474-7423
Email: Student_accessibility@umanitoba.ca

Medical Notes

Students who are unable to meet a course requirement due to medical circumstances are currently not required to submit medical notes. However, students are required to contact their instructor or academic advisor by email to inform of the missed work and make arrangements for extensions, deferrals, or make-up assignments. Please follow these guidelines, if you are unable to meet an academic requirement for your courses.

- Contact your instructor for term work such as a class, quiz, midterm/test, assignment, lab;
- Contact an advisor in your faculty of registration for a missed final exam (scheduled in the final examination period);
- Inform your instructor/advisor as soon as possible, do not delay. Note for final exams, students must contact within 48 hours of the date of the final exam.
- Email your instructor/advisor from a U of M email address, and include your full name, student number, course number, and academic work that was missed within 48 hours of the date of the missed

examination.

Please note that circumstances that result in missing multiple course assignments/tests/classes may require medical documentation (e.g., Authorized Withdrawal, Tuition Fee Appeal, Leave of Absence, or [accessibility-related accommodations](#)). Students are advised to speak with an [advisor in their faculty/college/school of registration](#) in this case.

Privacy Concerns

This course is delivered remotely using a video conferencing platform, and you may be required to install University approved software on your device and you may be required to have and use a webcam. During videoconferencing, your personal information, in the form of your name, image, and any questions or answers you pose during classes, may be collected under the authority of The University of Manitoba Act. The information you provide will be used by the University for the purpose of supporting student learning.

Exams for Fall term courses may be invigilated online. If your exam is invigilated online, you may be required to install University approved software on your computer and you may be required to have and use a webcam while taking the exam. During proctoring, your personal information, in the form of your name and image may be collected under the authority of The University of Manitoba Act. Your personal information will not be used or disclosed for other purposes, unless permitted by The Freedom of Information and Protection of Privacy Act (FIPPA). If you have any questions about the collection of your personal information, contact the Access & Privacy Office (tel. 204-474-9462), 233 Elizabeth Dafoe Library, University of Manitoba, Winnipeg, MB, R3T 2N2. If you have any questions regarding your online lectures or exams, please contact me.

Recording Synchronous Sessions/Online Lectures

No audio or video recording of this material, lectures, or presentations is allowed in any format, openly or surreptitiously, in whole or in part without permission. Course materials (both paper and digital) are for the participant's private study and research, and must not be shared. Violation of these and other Academic Integrity principles, will lead to serious disciplinary action.

SCHEDULE A

A Schedule A document is posted on the course website. This is a Policy and Resource Document with information on various University and Unit policies regarding academic integrity, student discipline, and respectful learning environment, for example, and on academic and student supports that are available, including a statement regarding mental health with referral information to the Student Counselling Centre and University Health Services.

PHYS 4386 Course Outline Fall 2020

This course is the third course on quantum mechanics. It introduces the mathematical foundation and discusses variational approaches, time-dependent perturbation theory, and the application of quantum mechanics to many-body systems.

1. RECAP

2. MATHEMATICAL FORMULATION OF QUANTUM MECHANICS

3. PERTURBATION THEORY AND VARIATIONAL APPROACHES

4. TIME-DEPENDENT PERTURBATION THEORY AND SCATTERING THEORY

5. IDENTICAL PARTICLES

PLAGIARISM AND CHEATING

(University of Manitoba Undergraduate Calendar, General Academic Regulations, Academic Integrity)

To plagiarize is to take ideas or words of another person and pass them off as one's own. In short, it is stealing something intangible rather than an object. Obviously it is not necessary to state the source of well known or easily verifiable facts, but students are expected to acknowledge the sources of ideas and expressions they use in their written work, whether quoted directly or paraphrased. This applies to diagrams, statistical tables and the like, as well as to written material, and materials or information from Internet sources. To provide adequate documentation is not only an indication of academic honesty but also a courtesy which enables the reader to consult these sources with ease. Failure to do so constitutes plagiarism. It will also be considered plagiarism and/or cheating if a student submits a term paper written in whole or in part by someone other than him/herself, or copies the answer or answers of another student in any test, examination, or take-home assignment.

Plagiarism or any other form of cheating in examinations or term tests (e.g., crib notes) is subject to serious academic penalty (e.g. suspension or expulsion from the faculty or university). A student found guilty of contributing to cheating in examinations or term assignments is also subject to serious academic penalty.

EXAMINATIONS: PERSONATIONS

(University of Manitoba Undergraduate Calendar, General Academic Regulations, Final Examinations)

A student who arranges for another individual to undertake or write any nature of examination for and on

his/her behalf, as well as the individual who undertakes or writes the examination, will be subject to discipline under the university's Student Discipline Bylaw, which could lead to suspension or expulsion from the university. In addition, the Canadian Criminal Code treats the personation of a candidate at a competitive or qualifying examination held at a university as an offence punishable by summary conviction. Section 362 of the Code provides:

Personation at Examination

362. Every one who falsely, with intent to gain advantage for him/herself or some other person, personates a candidate at a competitive or qualifying examination held under the authority of law or in connection with a university, college or school or who knowingly avails him/herself of the results of such personation is guilty of an offence punishable on summary conviction. 1953- 54,c.51,s.347.

Both the personator and the individual who avails him/herself of the personation could be found guilty. Summary conviction could result in a fine being levied or up to two years of imprisonment.

FACULTY OF SCIENCE STATEMENT ON ACADEMIC DISHONESTY

The Faculty of Science and The University of Manitoba regard acts of academic dishonesty in quizzes, tests, examinations, laboratory reports or assignments as serious offences and may assess a variety of penalties depending on the nature of the offence.

Acts of academic dishonesty include, but are not limited to bringing unauthorized materials into a test or exam, copying from another individual, using answers provided by tutors, plagiarism, and examination personation.

Note: cell phones, pagers, PDAs, MP3 units or electronic translators are explicitly listed as unauthorized materials, and must not be present during tests or examinations.

Penalties that may apply, as provided for under the University of Manitoba's Student Discipline ByLaw, range from a grade of zero for the assignment or examination, failure in the course, to expulsion from the University. The Student Discipline ByLaw may be accessed at:

http://umanitoba.ca/admin/governance/media/Student_Discipline_Bylaw_-_2009_01_01.pdf

The Faculty of Science guidelines on plagiarism and cheating and suggested minimum penalties are available at:

http://umanitoba.ca/faculties/science/resources/Acad_Dishon_TABLE_RevCSS_AdminC_Jul2012_WEB.pdf

All Faculty members (and their teaching assistants) have been instructed to be vigilant and report all incidents of academic dishonesty to the Head of the Department.